

WINTER 26 | VOL 64

mango matters

KATHERINE R&D WORKSHOP AND DARWIN FIELD DAY

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CSIRO MANGO
SEED WEEVIL
PROJECT

P/24

GENOMIC INSIGHTS
INTO MANGO
FLOWERING

P/28

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Marketing Program Update

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Automated Pest Detection Using Non-Destructive X-ray Imaging

Front Cover: Pictured from left to right is Derek Nowland, Grant Nowland, Dora Andreou and Leo Skliros.

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Hort Innovation **MANGO FUND**



"I have been actively working with a number of chemical companies to highlight the current priorities the industry has for new chemistry."

— BEN MARTIN

Chairman's Report

Ben Martin

Chairman, AMIA

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The continuing Middle East conflict appears to have no end in sight as positions seem to change on a daily basis. The continued impact on both availability and costs of fuel, freight and fertiliser and other inputs appear to be with us through the mango season. While we continue to highlight the impact on production costs to retailers, it's important all growers maintain accurate records of all production costs and ensure that all people in their supply chains are aware of the impact of increased costs. We also have seen a significant rise in the award rate for labour and the introduction of payday super as well. It will also be of critical importance to be aware of market prices through your season and consider how these extra costs will impact your business.

With APVMA continuing to undertake reviews of older chemistry our access to crop protection products are increasingly coming under pressure. While it's pleasing that Hort Innovation is taking a leadership position in this area with a range of substantial research activities in addition to managing the minor use permit processes, it's also our responsibility to be on the front foot with regard to access to crop protection products for our industry. I have been actively working with a number of chemical companies to highlight the current priorities the industry has for new chemistry. Hopefully we will see a number of new registrations for new chemicals and some existing ones for mangoes in the next 18 months.

We are planning to commence a review of our access to products, including highlighting what products we could lose in the near future, new products on the horizon and what research is needed to access products registered in other crops in Australia or internationally. This review should provide a road map for what we need to do over the next five years with regards to crop protection and allow chemical companies plan for future access.

In May, our team, in collaboration with NT DAF held a half day field day in Darwin. There was strong interest in NTDAF's

research into integrated pest management at Stephen Beatty's orchard and their research into Mango Twig Tip Dieback at Leo Skliros's orchard. While both areas of research are important, the impact of MTTD is being increasingly felt by many Darwin mango growers and finding a solution is a priority for not only Darwin mango growers, but all growers.

Biosecurity Qld, in partnership with AMIA and North Qld Farmers (Bowen Gumlu Growers) are currently recruiting for a new biosecurity officer to be based in the Bowen/Burdekin region. This pilot program is aimed at bringing a stronger partnership between government and industry and improve biosecurity preparedness.

We held our AGM in late May. Leo Skliros was returned unopposed for the Northern Territory/Northern Western Australia. I would like to thank Leo for once again putting his hand up to represent not only growers in his region, but all growers and the broader industry. At the Board meeting following the AGM, my fellow Board Directors supported my return as Chairman and John Nucifora as Deputy Chairman. I would like to thank Directors and look forward to representing AMIA for another year.

Our Industry Development Manager Marine Empson has left us to join one of Australia's largest banana growers. Marine started with AMIA in 2018 as our Queensland IDO and then became our IDM in 2021. Marine undertook a lot of work across many aspects of what we do. While she leaves big shoes to fill, we wish her well for her future.

With the start of the Darwin harvest around the corner, I wish growers the best of luck for this coming season.



CEO's Report

Trevor Dunmall

CEO, AMIA

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Last season Australian mango growers produced over 78,000 tonnes of mangoes (> 11 million trays). This volume was well above our original crop forecast of just over 58,000 tonnes (> 8 million trays). Our team puts a lot of work into developing the crop forecast for each region and then collecting and collating the crop dispatch data on a weekly basis during the season. We really appreciate the many growers who go out of their way to contribute, always during the busiest time of the year. Despite our efforts and the support from many growers and marketers, there is still room for improvement, and we will continue to focus on improving the accuracy of our forecasts.

We have commenced planning our next mango conference. Based on the success of the first research symposium, held in 2024, this conference will feature similar components; mango research and development, and researchers who contribute to our industry. We welcome ideas for topics and content for both the conference and the research symposium.

The team has been working on developing regional biosecurity plans for each key mango production region. These plans have

been developed in conjunction with local departments and biosecurity staff. So far, we have developed plans for the Katherine and Bowen/Burdekin regions and over the next month we will be finalising plans for Darwin and Mareeba/Dimbulah regions. In Darwin we also had several representatives participate from the NAQS team and in Bowen representatives of North Queensland Farmers.

At the same time, the team has developed an orchard biosecurity plan template that growers can adapt to their businesses. Growers who don't have their own biosecurity plans can use these templates as a basis for creating their own plan. These plan templates will be available in hard copies and digital format at our pre-season roadshows.

Our industry's export performance continues to lag with a few bright spots (e.g. New Zealand). Issues with tough protocols to some markets, competition from countries with much lower production costs and access to crop protection products continue to be challenging. It's important we continue to work to improve the basic parameters around export so while the challenges will still exist, they are less of a barrier.

Our pre-season roadshow meetings commence in Darwin in early August. I encourage all growers to attend. These meetings are an opportunity to discuss issues with us and your fellow growers.

As reported previously, our Industry Development Manager, Marine Empson has left us to join one of the large north Queensland banana growers. Marine was with AMIA for eight years and was recognised for her knowledge and passion for the industry. We wish her well for the future.

Coming soon

**NEW ORCHARD
BIOSECURITY
PLAN TEMPLATE**

Available in hard copy
or on-line.



AROUND THE REGIONS



Southern Western Australia



David Morcombe

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In the southwest, it has been a fairly typical winter. The minimum temperatures have been colder than average so far. We did have a strong storm which came through but as the trees were in dormancy, there was no immediate impact on production.

I took the opportunity to attend the first Forum on Mango genetic improvement held in the Philippines in late July. It was an ACIAR supported meeting for the South West Asian region. It was interesting to get an insight into the issues faced by growers to our north, which are not dissimilar to those we face in Australia. Like us, most of their crop goes to their local markets and they focus on their preferred local varieties. The collaboration should benefit the researchers from all countries involved, as genetics is such a complex field. There is a report on the forum in the magazine.

The season weather forecast is a bit ominous with super El Niño being mentioned. Hopefully the climate is not too adverse in the coming season and the Middle East problems will be just a memory.

Good luck for the new season.

Northern Territory & Northern Western Australia



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Hi all,

Another month closer to the 2026 season.

Flowering is still very patchy (at the time of writing), although cooler weather has become more prevalent during the latter part of July. With the expected related flowering and subsequent timing, growers are weighing up its financial viability and the timing to halt harvest. Uncertainty remains around variable harvest costs and the broader impact on consumer spending, particularly in light of recent interest rate rises and the latest budget.

On a positive note, the patchy flowering may help spread production volumes across September and October.

Last week I had the chance to taste a KP mango given to me by a Vietnamese grower – great flavour and aroma!

Geoff Warnock

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In Kununurra, the trees are looking very healthy following a favourable wet season and continued mild weather. Flowering commenced late June, with early-flowering orchards already showing promising results (at the time of writing). Pest pressure remains low. While the outlook for the season could appear fairly positive so far with a promising start to flowering, growers continue to face challenges including high production costs, particularly freight and fuel, as well as a shortage of packing facilities in the region following multiple businesses closures. Although fuel prices may ease before harvest, access to packing infrastructure remains a concern.

Far North Queensland & North Queensland



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Flowering is off to a promising start across the region, with recent cold mornings providing ideal conditions for bud burst and flower initiation. While a few blocks are flowering earlier than usual, most are showing a good mix of early bud push and flowering, with some leaf flush also beginning to show. Overall, the season is tracking well at this stage.

At this stage, there are no major pest issues being observed, with only low levels of mites, mealy bug and scale present and all currently below actionable thresholds.

Most growers have now completed pruning, nutrition and pest management programs following what felt like an extended wet season. Trees have settled well and are moving into bud swell and flowering stages. In some of the wetter areas, trees are appearing little paler than others; however, they are still showing good bud burst and current weather conditions should support continued development.

As always, managing production costs remains a key challenge. Once again, we are seeing an increase in minimum wages being passed on and adding further pressure to the cost of production. As growers, we need to remain vigilant in managing these rising costs to maintain profitability and ensure the long-term sustainability of our businesses.

Finally, I also attended the AMIA AGM recently and would like to acknowledge the AMIA team for their ongoing work in supporting the industry over another year.

John Nucifora

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It's that time again, another season is fast approaching.

At this point, it's still a little too early to tell how flowering is progressing, but with the favourable weather conditions so far, it looks like flowering will be strong.

One of my biggest concerns is the cost of production. Costs have gone through the roof and are becoming increasingly difficult to manage. Mango growers in my region have been operating on very thin margins for many years. With this savage increase in the cost of production, I fear the industry could suffer to the point of no return.

In the Mareeba-Dimbulah region, production costs are particularly high. I believe some of the growers in my region are among the best in the country, and I just hope we can survive these massive increases in costs. I can't express enough the impact they are having on our growers and businesses.

I wish all growers the very best for the season ahead.

Southern Queensland & New South Wales



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As we head into another mango season, I would like to thank all growers, packers, marketers and industry partners for their continued commitment to producing premium Australian mangoes.

The past season presented a number of challenges, from variable weather conditions and labour pressures to increasing production costs. Despite these challenges, our industry has continued to demonstrate resilience and a willingness to adapt.

Seasonal Outlook

Early observations indicate:

- Good flowering across many Central Queensland production regions.
- Variable flowering in South East Queensland depending on winter temperatures and rainfall.
- Continued focus on irrigation management due to ongoing climate variability.
- Increased emphasis on fruit quality and consistency to meet retailer expectations.

Growers are encouraged to continue monitoring orchards closely during fruit set and to maintain regular nutrition and pest management programs.

"As growers, we need to remain vigilant in managing these rising costs to maintain profitability and ensure the long-term sustainability of our businesses."

- JOHN NARDI



Why your AMIA membership matters

MEMBER BENEFITS

VALUABLE TOOLS & RESOURCES

- Access to the [Members Only Hub](#) on our website.
- Complimentary NIR dry matter testing with membership.

MARKET & INDUSTRY INSIGHTS

- Access to the weekly Wholesale Mango Market Price Reports
- Quarterly industry reports highlighting key issues and opportunities.

COMMUNICATIONS

- Hard copy editions of Mango Matters (alongside digital).
- Discounts on advertising and sponsorship opportunities.

REPRESENTATION & EVENTS

- Savings on ticketed Australian Mangoes events.
- The opportunity to elect a Grower Director and have your voice heard.
- Influence AMIA's work through member feedback.

PARTNER DISCOUNTS

- **Significant savings at Bunnings.** Members are already saving hundreds of dollars on trade purchases.



AMIA works on behalf of our industry and your membership provides the support we need. We work to represent the industry's needs to government and sectors of business, raising issues that affect growers directly. Your membership helps strengthen the voice of Australia's mango growers.

This important work we do is **not** funded by grower levies. Our advocacy, lobbying and representation on critical issues is funded by your membership. While grower levies fund much of the work undertaken by our dedicated team members in areas of extension, communication and biosecurity, it is the support of AMIA members that enable us to advocate on grower needs now and into the future.

We are increasing the range of benefits available to members. These benefits include:

- 1. Significant discounts at Bunnings Trade**
- 2. Access to complimentary maturity testing (key production regions only)**
- 3. Discounts on ticketed AMIA events**
- 4. Advertising discounts in AMIA's magazine, [Mango Matters](#), distributed to over 1400 readers**
- 5. Vote on who represents your interests on the AMIA board**

Several AMIA members who have signed up for the additional Bunnings discount are saving more than their annual AMIA membership fee.

Thank you to everyone who is already a member. If you are not a member yet, please consider applying for membership now. We need you!

Become a Member

Email or Post:

Fill out this [membership form](#) and send it to accounts@mangoes.net.au or PO Box 376, Brisbane Markets QLD 4106



Online:

Scan the **QR code** or [click here](#) to sign up online in minutes.



Supply Chain Engagement Update: Preparing for the Season Ahead

By Jenna McManus, Australian Mangoes Supply Chain Engagement Manager.

Planning is underway for the upcoming mango season, with retailer conversations commencing. A key focus is identifying opportunities to engage retail teams, support strong in-store execution and maintain momentum throughout the season.

As part of this planning, we're exploring how existing engagement initiatives, including sales challenges, could evolve in partnership with retailers. The aim is to find meaningful ways to recognise store teams and support category performance during the season. Recent feedback from participants in last season's Metcash challenge highlighted the value such initiatives provide store teams, with one winner commenting, **"Love taking part in these things and always a bonus to win!"** while another noted, **"We are extremely grateful for winning and it means a lot to myself and the team. It makes all the hard work and effort they put in worth it."**

As part of our pre-season preparations, we're also reviewing and updating the Australian Mangoes Retail Guide.

Jenna is also looking forward to attending the upcoming NT and WA pre-season roadshows in August, providing an opportunity to connect directly with growers and industry stakeholders as we prepare for another exciting season ahead.

Bringing the season to life

This season will also see a dedicated @AussieMangoes organic social media program kick off, delivered alongside the Supply Chain Engagement role through Bespoke Agency.

Content capture will commence in early August, with a focus on showcasing the people, places and passion behind Australia's mango industry. Throughout the season, followers can expect:

- Grower stories and behind-the-scenes industry content
- Harvest and supply updates
- Variety highlights and educational content
- Recipe inspiration and usage occasions
- The moments that make mango season unique

The objective is to create engaging, industry-led content that celebrates Australian mangoes from the first signs of the season through to the final harvest, while helping keep growers and the wider industry connected to activity taking place across the country. Make sure you're following the fun on Instagram and Facebook @AussieMangoes, as well as LinkedIn for industry updates.

2026 MANGO PRE-SEASON ROADSHOWS

Darwin
10 August

Katherine
11 August

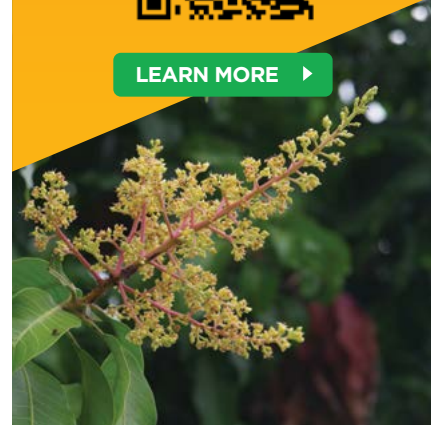
Kununurra
12 August

Mareeba/Dimbulah
15 September

Bowen/Burdekin
17 September



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2026–27 Mango Marketing Program Update

Lucy Stock, Associate Marketing Manager, Hort Innovation

The Australian Mangoes marketing program is funded by Hort Innovation, using the mango marketing levy. Hort Innovation is the grower-owned, not-for-profit research and development corporation for Australian horticulture.



Your mango marketing representatives.

Driving momentum into the 2026–27 season

The Mango Marketing Strategic Investment Advisory Panel (SIAP) has endorsed the marketing plan for 2026–27. The program builds on the success of integrated activity and earned media to accelerate awareness, demand and category growth for Australian mangoes.

Strategic focus for 2026–27

The endorsed plan takes a multi-channel approach, with a strong emphasis on awareness-led activity supported by retail and export initiatives. Key areas of focus include:

- Scaling awareness through new creative development and campaign rollout
- Social and content-led storytelling, including recipes, usage inspiration, grower and educational content
- Paid media across social media, YouTube, out-of-home panels in close proximity to supermarkets
- New inclusion of radio for broad, cost-efficient reach, to keep mangoes top of mind
- Continued influencer partnerships to amplify campaign messaging and drive engagement

- Supply Chain Engagement Manager to strengthen mango category performance by providing a dedicated industry contact who connects supply chain stakeholders with timely insights, education and coordination throughout the season.

Program overview

The 2026–27 marketing program will be delivered across three strategic pillars, ensuring a balanced approach from awareness through to conversion and export market growth:



Retail and export programs will work in parallel to convert awareness into purchase and support growth in key markets. Retail activity will focus on in-store visibility and shopper conversion, while export activity will prioritise key markets such as New Zealand.

Spotlight: New Zealand activation

A targeted activation in New Zealand is planned for November to support the start of the export season. The activity will focus on increasing visibility and driving impulse purchase through an integrated in-store and online approach across Woolworths NZ stores.

- In-store visibility through signage and high-impact placements to drive shopper attention
- Online amplification through branded placements and conversion-focused formats

What this means for industry

The 2026-27 marketing program is designed to drive stronger consumer demand throughout the season, increase usage occasions and reinforce the value of Australian mangoes.

Grower participation and representation remain critical to delivering authentic and compelling campaign storytelling across media and content channels. If you are interested in being part of the mango marketing program, please reach out to Lucy Stock – lucy.stock@horticulture.com.au

Next steps

Work is underway across:

- Creative and campaign development
- Media and channel planning
- Retail program alignment
- Partner and influencer engagement

**Hort
Innovation**

For further information please contact:

Lucy Stock:

lucy.stock@horticulture.com.au



Agrichemical update

June 2026

NT Fipronil Minor Use Permit Expired

The fipronil minor use permit for controlling giant termites in the NT expired on 31 January 2026. NT Farmers applied for renewal; however, this is still pending review and approval by the APVMA. Please note that the permit for QLD and WA is separate and remains current.

ParaMite minor use permit extended (PER87232)

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

Permit ID	Description	Date Issued	Expiry Date	Permit holder
PER87232 version 3	ParaMite Selective Miticide (Etoxazole) / Mangoes / Tea Red Spider Mite	16-Jan-2019	30-Jun-2031	Hort Innovation

Malathion Permit Update – Mango Fruit Fly Control (PER83998)

The APVMA has advised that the minor use permit for malathion (PER83998) for mango fruit fly control, including Queensland Fruit Fly and Mediterranean Fruit Fly, will need to undergo an environmental risk assessment.

As a result, the current permit will expire on 31 July 2026 and will not be reissued before this date. A renewal can only be considered once the environmental assessment is completed, which may occur up to six months after the permit expiry.

This delay is particularly disappointing given the renewal application was submitted in January. The matter has been raised with the APVMA.

Industry and growers are encouraged to note the confirmed expiry date and plan accordingly. Further updates will be provided as more information becomes available.

Paraquat/Diquat

The Australian Pesticides and Veterinary Medicines Authority (APVMA) has published its [final decision](#) on the extensive chemical reviews of non-selective herbicides paraquat and diquat.

New APVMA update on Chemical Reviews

Information for this article has been sourced from the Ag-Chem Update, prepared by DTS Regulatory Consultants through the project. MT24008 – Regulatory Support & Response Co-ordination. This multi-industry project has been funded by Hort Innovation, using industry research and development levies and contributions from the Australian Government.

APVMA has updated its 2026–2030 reconsideration priorities, which means more chemicals are now flagged for closer review over the next few years. The list does not mean these chemicals

are immediately suspended or cancelled, but it does signal that APVMA expects to re-check the contemporary safety, residue, trade and environmental data for each one.

See [here](#) for details.

What growers need to know

The main message is that the priorities have changed and while some reviews have been delayed (e.g. mancozeb and other dithiocarbamates), some other important horticultural chemistry will be under review, especially where there are concerns about spray drift, pollinators, residues, trade, or environmental persistence. APVMA may also take interim action through label changes or use restrictions before a full reconsideration starts.

Chemicals on the priority list

The chemicals now prioritised for a full reconsideration include dimethoate & omethoate (2027), flupropanate (2027), methomyl (2028), phorate (2028), chlorothalonil (2029), propargite (2029), and the dithiocarbamates group (2030), including mancozeb, metiram, propineb, thiram, zineb and ziram.

The Group 4 phenoxy-carboxylate herbicides (2026): 2,4-DB, dichlorprop, MCPA, MCPB and mecoprop, are specifically being reviewed for spray drift

risk with respect to the risks to sensitive vegetation areas and natural aquatic areas.

Why this matters in horticulture

For growers, the biggest issues are likely to be:

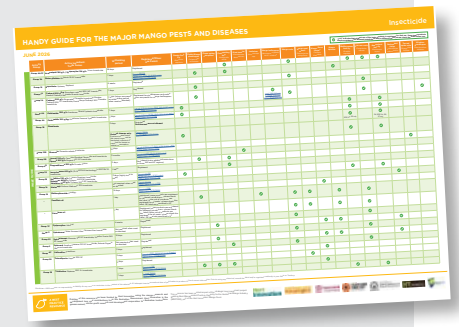
- potential loss or heavy restrictions of important crop protection chemical uses,
- tighter use directions or buffer requirements,
- more attention to off-target drift and sensitive crops,
- potential residue and export trade impacts,
- and, for some products, increased scrutiny around bees, aquatic life and soil persistence.

Practical next step

If your business relies on any of these chemistries, it would be sensible to review your spray programs, resistance plans, residue risk, and trade exposure now, rather than waiting for APVMA action. Products may remain available for some time, but the regulatory direction is clearly toward reassessment and possible loss or label change.



Access our agrichemical resources [here](#).



★ **SPONSORSHIP AND TRADE EXHIBIT OPPORTUNITIES ARE OPEN** ★

For all enquiries, please contact Trevor by phone 0400 808 689 or at CEO@mangoes.net.au

Our next Mango Conference: we need your ideas!



Brisbane Convention and Exhibition Centre will host the 2027 Australian Mango conference.

The dates have been set for the 14th Australian Mango Conference incorporating the 2nd Australian Mango Research Symposium. Following the success of the 2024 Research Symposium, the 2027 conference will also incorporate the 2nd Australian Mango Research Symposium.

The conference and research symposium will be held at the Brisbane Convention and Exhibition Centre during the week commencing Monday 10th May 2027.

We encourage all growers, supply chain and industry partners to attend and participate.

We also encourage growers and all sectors of industry to contribute ideas for speakers and topics. Please send us your suggestions by Friday 18th September or reach out to one of our team or your local AMIA Board Director.



2027
**14th Australian
MANGO
Conference**

10 – 13 May 2027

Brisbane Convention
and Exhibition Centre

Paul Burke appointed Independent Chair of NFF Horticulture Council

The National Farmers' Federation (NFF) Horticulture Council has appointed Paul Burke as its new independent Chair, bringing extensive experience in agricultural industry representation, governance and advocacy to the role.

Mr Burke's appointment follows a rigorous, merit-based recruitment process undertaken by the Council over recent months. He succeeds Jolyon Burnett, who has chaired the Council since 2023.

Mr Burke was a founding member of the Council while serving as CEO of NT Farmers. His industry representation career also spans CEO of the Northern Territory Cattlemen's Association (NTCA) and State Operations and Membership Manager at AgForce Queensland, alongside service on numerous state, territory and national policy committees.

As CEO of NT Farmers, Mr Burke led negotiations with government and industry partners to deliver a pathway for seasonal workers from Vanuatu during the COVID-19 border shutdown, work that helped keep the Territory's horticulture industry operating through one of its most difficult periods.

He brings a breadth of governance experience spanning corporate agribusiness and grassroots enterprise development. Mr Burke is a director of ASX-listed Duxton Farms, where he chairs the ESG Committee, an independent director of MG Corporation and Kimberley Cotton Company, Independent Chair of the North Australia Beef Research Council, and Chair of the Northern Territory's Pastoral Land Board.

He was also the driving force behind the Yirrkalá Horticultural project in Arnhem

Land, which has created sustainable career pathways for local Aboriginal people and now supplies fresh produce to community stores, hospitality venues and mine sites across the region.

NFF Chief Executive Officer Mike Guerin said Mr Burke's blend of grassroots representation experience and contemporary governance expertise made him an outstanding appointment.

"Paul has been part of the Horticulture Council since its earliest days, and he understands what it takes to represent farmers because he's done it — at AgForce, at NTCA and at NT Farmers, he's sat across the table from government and industry on behalf of primary producers and gotten results," Mr Guerin said.

"Few people can point to a career that runs from negotiating a seasonal workforce solution during a pandemic border shutdown to chairing the ESG committee of an ASX-listed agribusiness and building a horticulture enterprise from the ground up in Arnhem Land. That range is exactly what the Council needs as it works through a significant period of pressure and change for the sector, in the field and along the supply chain."

Mr Burke said he was looking forward to working with the Council's member bodies and key stakeholders.

"I was a founding member of the Horticulture Council, so I have an existing network, along with a strong history of policy development, advocacy and industry knowledge," Mr Burke said.

"The agriculture industry is my passion. There is no industry I would prefer to be in. Whether it's a pastoral land board, an ASX-listed boardroom or a grower



"The agriculture industry is my passion. There is no industry I would prefer to be in."

— PAUL BURKE

policy committee, I've always found the job comes down to bringing the right people together, building trust, a common understanding, to solve complex issues, and that's exactly what I'll bring to the Council."

Mr Guerin also thanked outgoing Chair Jolyon Burnett for his outstanding contribution to the Council and the horticulture industry in a career spanning four decades.

Mr Burke's appointment takes effect immediately.

About the Horticulture Council

The Council is the recognised peak body for forming policy and advocating on behalf of the national horticulture industry. Established in 2017, it now comprises 19 national commodity and state-based horticulture bodies.

It is a member of the National Farmers' Federation, free to establish and advance its own policy positions and responses issues impacting the horticulture industry.



AMIA FAREWELLS MARINE EMPSON

Our Industry Development Manager, Marine Empson has resigned and is leaving to join one of Australia's leading banana growers. Marine has been with AMIA for eight years. Marine commenced with AMIA as the Queensland Industry Development Officer in 2018 and was appointed as the IDM in 2021. Marine's substantial contribution to AMIA and the Australian mango industry cannot be understated. Her professionalism and knowledge were recognised by everyone she worked with and the team at AMIA consider themselves very fortunate to have had the opportunity to work with Marine. While we will miss Marine we wish her good fortune for the future.

Marto's Mangoes named Family Business of the Year at Hort Connections 2026



"They definitely all play a part in the success of the business.."

— BEN MARTIN

We congratulate Ben and Ash-Lei Martin of Marto's Mangoes, who have been recognised on the national stage, taking out the 2026 Family Business of the Year award at Hort Connections in Adelaide, celebrating their commitment to family farming, innovation, and industry contribution.

Marto's Mangoes is a true family-operated business. Ben's parents established the original farm in 1990, and Ben purchased his first farm in 2007. Since then, Ben and his wife have expanded the operation several times, building on these foundations while driving innovation and ongoing improvements across the business.

Ben also plays an active leadership role in the Australian mango industry. He has served as an AMIA Director since 2013 and as Chairman since 2018, contributing his time, experience and leadership to help strengthen and grow the sector.

We're proud to see mango growers recognised on a national stage.

The Martin family - parents Bernadette & Gary, children Lachlan & Georgia Martin, Ben and Ash-Lei Martin, .

"It was a privilege to be nominated and recognised alongside so many passionate and hardworking farming families from across Australia."

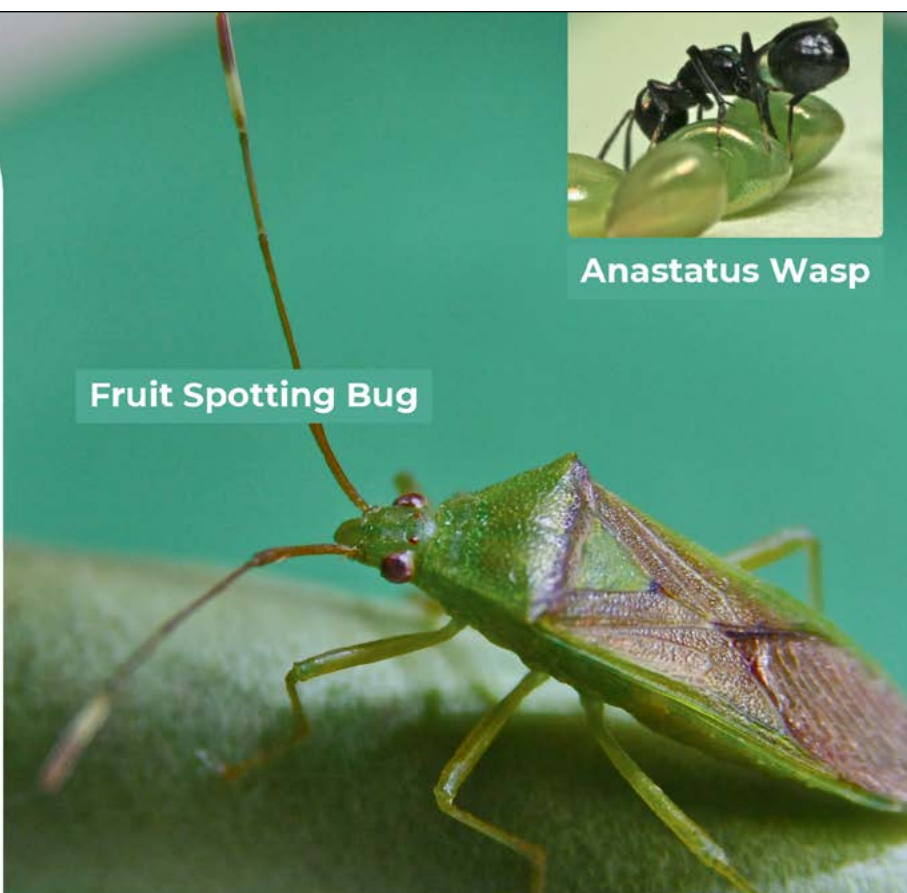
— BEN MARTIN

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Katherine R&D Workshop and Darwin Field Day



MTDD presentation.

In late May, Australian Mangoes and NTDAF hosted a two-day event across two key mango-growing regions – Katherine and Darwin – featuring field walks and exploring the latest developments in mango research across a broad range of topics.

The first day centred on an R&D Workshop, held at the Katherine Research Station. Researchers from the NT and QLD presented on the latest mango research across a range of topics, including strategies to reduce fruit drop, the use of genomics to improve flowering, tissue culture developments, rootstock and scion trials, post-harvest assessments of different varieties, and studies on mango defence systems to floods, drought and pathogens. Interactive sessions provided attendees with the opportunity to discuss future research

priorities and explore how current findings can be applied in commercial production. The workshop was followed by a tour of the Katherine Research Station, led by NTDAF's local researchers, showcasing current mango trials on controlled atmosphere (CA) storage trials and the mango germplasm varietal block.

The second day of the event took place across two commercial orchards in Berry Springs, in the rural Darwin region. The field day started with an Integrated Pest Management (IPM) field walk led by NTDAF's Entomology team. Following a presentation from NTDAF's Principal Entomologist, Brian Thistleton, on mango pests and beneficials insects, attendees toured the orchard in small groups to observe insect activity and learn about surveillance techniques such as sticky traps and sweep nets.



Katherine Research Station Tour.

Participants then travelled to a nearby orchard to hear about ongoing trials on the Integrated Management of Mango Twig Tip Dieback (IM-MTTD). Researchers from NTDAF's Plant Industries team outlined current investigations into management solutions, including endotherapy treatments and integrated management approaches. Attendees also gained insights into the use of spore-trapping technology with Charles Simons, Chief Sales and Revenue Officer at BioScout, presenting on the company's AI-powered airborne particulate detection technology, explaining how it helps identify and monitor microorganisms present within orchards.

The event concluded with the NTMIA Annual General Meeting and dinner, providing an opportunity for growers and industry representatives to connect and network.

Australian Mangoes would like to thank NTDAF's Entomology and Plant Industries teams for leading the field activities and sharing their expertise, as well as the Katherine Research Station staff for hosting and supporting the event. Appreciation is also extended to the growers who hosted the field walks on their properties.

A special Thank you to [BioScout](#) for attending, presenting and sponsoring the event.



IPM Field Walk.



IPM Field Walk



IPM Field Walk.



IPM Field Walk



BioScout presentation.



Katherine R&D Workshop.



MTTD Field Walk



Katherine Research Station Tour.



MTTD Field Walk



Strengthening Regional Preparedness Through Regional Biosecurity Planning

Katherine Regional Biosecurity Workshop – May 2026.

The Australian mango industry continues to strengthen its preparedness for exotic pest incursions through the development of regional biosecurity plans tailored to the unique characteristics, risks and operating environments of key production regions. As part of this national biosecurity preparedness project, regional workshops have recently been conducted to support the development of these region-specific plans and enhance readiness for potential pest and disease incursions.

At the time of writing, two regional biosecurity plans have been finalised:

- Bowen/Burdekin Regional Biosecurity Plan
- Katherine Regional Biosecurity Plan

The workshops brought together agronomists, entomologists, regional grower organisations, government representatives and plant pathologists to review draft plans and provide local knowledge and expertise. Representatives from the Bowen Gumlu Growers Association, Biosecurity Queensland, QDPI, NT DAF and Northern Australia Quarantine Strategy all contributed to the discussions.

A key focus of the workshops was recognising that biosecurity risks, pathways and stakeholders vary between regions. Differences in geography, production systems, workforce movement, transport networks and supporting infrastructure all influence how a pest incursion may occur and how effectively a region can respond.

The workshops provided an opportunity to identify these regional specificities and ensure they were appropriately captured within each plan. Discussions covered pest and disease risks, potential pathways for pest and disease movement, and mitigation measures, all through the lens of a specific region.

As Australian Mangoes CEO Trevor Dunmall noted, “Effective biosecurity planning needs to reflect what is happening on the ground in each region. A one-size-fits-all approach doesn’t capture the realities of how our industry operates across different production environments.”

Similarly, NT Department of Agriculture and Fisheries Chief Plant Health Officer Sally Heaton highlighted the importance of regional input in strengthening preparedness, noting, “Bringing local knowledge into planning ensures that we understand not only the risks, but also the practical realities of response across diverse regions and industries.”

The workshops also supported the identification of key stakeholder groups relevant to biosecurity preparedness and response across each region, helping to strengthen coordination and communication pathways in the event of an incursion.

The completed plans outline:

- Regional boundaries and production areas
- Priority exotic pest threats
- Regionally significant pests and diseases
- Key risk pathways
- Potential impacts on production and trade
- Regional mitigation measures

An additional two regional biosecurity plans are currently in development for the Darwin and Mareeba/Dimbulah production regions with other planned to be finalised by May 2027. Orchard biosecurity plan templates have been developed and are now available to support growers and businesses to develop their own on-farm plans and further protect their operations.

We would like to thank everyone who contributed their time, expertise, and local knowledge to the workshops and plan development process. Their input has been invaluable in ensuring the plans are regionally relevant and reflect existing efforts to mitigate risks across northern Australia.

These activities form part of the industry’s ongoing commitment to strengthening preparedness, improving coordination and ensuring the Australian mango industry is better equipped to respond to future biosecurity threats.



Bowen Regional Biosecurity Workshop – May 2026.

“Bringing local knowledge into planning ensures that we understand not only the risks, but also the practical realities of response across diverse regions and industries.”

— SALLY HEATON, NTDAF CHIEF PLANT HEALTH OFFICER

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Two Crops, One Block: Intercropping Papaya

This article has been kindly shared from Papaya Press Edition 20 March 2026.

After Tropical Cyclone Jasper and the wet season that followed wreaked havoc through Far North Queensland in 23/24, it forced some hard farm decisions.

For Joe and Monique Moreno of Paradise Orchards near Mareeba, their 35-year-old avocado block had to go. Replanting would mean a four-year wait for income. "That just wasn't an option," Monique said. "We were staring at a massive cashflow gap", she added. After back-to-back tough seasons, the couple knew they needed something different. Intercropping papaya wasn't simply about adding another crop, it was about building resilience.

Paradise Orchards is a mixed avocado, mango and now papaya operation. At the time of writing, nerves and excitement are building as the team prepares for their first papaya harvest.

"Intercropping papaya wasn't simply about adding another crop, it was about building resilience."



Joe and Monique Moreno with their young orchard in December 2025. Mango planted on 9m spacing from existing avocado block with papaya planted either side.

"My father-in-law had grown papaya here about 25 years ago, so we had some experience," Joe said. "We even had old picking trailers lying around ready to go, it was a no-brainer really. Quick turnaround from seed to harvest, it fits our system, and we could potentially double production off the same piece of land. We thought we'd give it a crack", he added.

Being mango farmers, mango was the logical choice. "Being an old avo block we know the phytophthora load is high, but you can't kill a mango," Joe laughed. "We ground the stumps down, planted mango between them and papaya on either side. We drilled the 16,000 holes by hand because of the old roots, but it meant we could use the existing mainlines. We're monitoring soil health and phytophthora closely with our agronomist." Planting in three stages proved valuable, particularly for lessons in weed control.

"By the last planting I went fully mulched. In hindsight I realised how important the timing of planting is for weeds too", he added.

Pest pressure hasn't significantly changed. "Fruit spotting bug is our main issue," Joe said. "But I don't think papaya has made it worse", he added. Inputs have increased but so has output potential. "We are using more water and nutrition than a straight mango block, but we're farming the land to twice its potential. The mangoes seem to be loving the papaya program so far", he added.



Clear difference in weed suppression in un-mulched compared to mulched blocks.



Mature papaya ready for harvest surrounding the growing mango.

“The mangoes seem to be loving the papaya program so far.”

For Monique, intercropping is also about workforce stability. “Papaya is hands-on. It needs more management,” she said. “But once we start harvesting, the goal is steady, year-round employment for a core team across all crops”, she said.

With the first harvest approaching, the couple remain realistic. “I’ll have to see how the numbers stack up to decide if we’d do it again,” Monique said.

For Joe, success isn’t just about yield. “Of course it must pay, but for me, it’s about getting good market feedback. We’re not about being the biggest, we want to be reliable and produce quality fruit”, he said.

Both Joe and Monique made it clear that trying something new isn’t something you tackle alone. “You need a good team around you,” Monique said. “Agronomists, finance support, QRIDA, DPI, FNQ Growers, Papaya Australia; there are great resources out there that we are grateful for, but growers don’t always tap into them”.

Joe’s advice for others considering intercropping – “Just have a go,” he said. “Do your research. Expect to make mistakes. And don’t be afraid to ask for help”. This mango and papaya system is the first of its kind in Australia and we look forward to watching it develop.



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Mango Shelf-Life Calculator out now!

The Queensland Department of Primary Industries has released a new mango shelf-life calculator designed to help industry deliver more consistent, high-quality fruit to consumers.

Developed by Saeedeh Taghadomi Saberi and Boyd Tarlinton through the Serviced Supply Chains II project (AM21000), the Fresh Intel calculator is an online decision-support tool built on extensive shelf-life modelling. It allows growers and supply chain partners to test “what-if” scenarios and better understand how different factors influence remaining shelf life.

Users can tailor scenarios by selecting mango varieties (Honey Gold, KP, R2E2), production regions, fruit maturity, treatment, and handling conditions along the supply chain. The tool provides practical insights to support more informed decision-making, helping businesses manage supply chain risks and disruptions while improving consistency and reducing waste.

The calculator is now available to Australian producers and exporters through a link via the Australian Mango Industry Association (AMIA) webpage.

The Serviced Supply Chains II project (AM21000) is funded by the Hort Innovation Frontiers Fund, Avocado and Strawberry research and development levy, and contributions from the Australian Government, with co-investment from the Department of Primary Industries, Queensland (DPI), Department of Energy, Environment and Climate Action, Victoria (DEECA), Department of Agriculture and Fisheries, Northern Territory (DAF), Department of Primary Industries and Regional Development, Western Australia (DPIRD), Pinata Farms Pty Ltd and Summerfruit Australia Ltd. Hort Innovation is the grower-owned, not-for-profit research and development corporation for Australian horticulture.



For more information or to discuss how this tool could benefit your business, please contact:

Andrew Macnish
M: 0475 839 609
E: andrew.macnish@dpi.qld.gov.au



Predicting Mango Shelf-Life

Accurately predicting mango shelf-life is key to delivering high-quality fruit that meets market and consumer expectations. This section provides tools and insights to help growers, packers, and exporters estimate how long fruit will remain in optimal condition.

Explore case studies that show how shelf-life modelling is being applied in practice, and access the Mango Shelf-Life Prediction Calculator (available to members only), developed by QDPI. The tool factors in maturity at harvest, temperature throughout the supply chain, and total time in transit to estimate remaining shelf life.

The goal is to support a shift from a traditional first in, first out approach to a more informed strategy of shortest remaining shelf life, first out, helping reduce waste, improve consistency, and better meet market requirements.



Case studies:

Applying shelf-life predictions in practice



Members only:

Shelf-Life Prediction Calculator

You must be an AMIA member and logged in to access the calculator.
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Image 1: Fresh Intel Calculator now available on AMIA website.

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Automated Pest Detection Using Non-Destructive X-ray Imaging

Dr Ben James, Dr Yi Liu, Dr Qingxiang Chen and Dr Maryam Yazdani

The Sensing and Sorting program within CSIRO Mineral Resources, in collaboration with the Market Access & Digital Agriculture Group in CSIRO Health and Biosecurity have investigated the potential intersection between leading edge detection technologies and biosecurity applications. One application is the automated detection of pests within mangoes using X-ray imaging combined with advanced machine learning models. With the support of the Australian Mango Industry Association (AMIA), a laboratory trial was conducted by CSIRO to test whether X-ray imaging provides a valuable tool for internal inspection and automated pest detection.

Advantages of X-ray Imaging

X-ray imaging has the potential to detect fruit pest infestations without damaging the fruit as x-rays penetrate through the skin and flesh of the fruit, revealing internal structures that surface-based methods, such as optical and infra-red scanning, cannot detect. By being able to visualize internal defects within the fruit itself, insect infestation and larval damage can be directly identified, this could allow packers and processors to grade fruit by internal quality and remove compromised produce before it reaches consumers.

Trial Details

X-ray imaging was conducted at CSIRO's Lucas Heights site, where a high-resolution industrial imaging setup was used to capture two perpendicular images of each mango. The experimental set-up used, as seen in Figure 1, utilises a micro-focus X-ray source (right of image) to generate the x-ray beam which passes through the mango placed on the object stage. X-ray projection images were acquired using a conventional flat-panel detector with an active area of 43 x 43 cm, comprising 4288 x 4288 pixels at a pitch of 100 Qm. The combination of a small focal spot and a high-resolution detector yield high-quality projection images with sharp delineation of internal features.

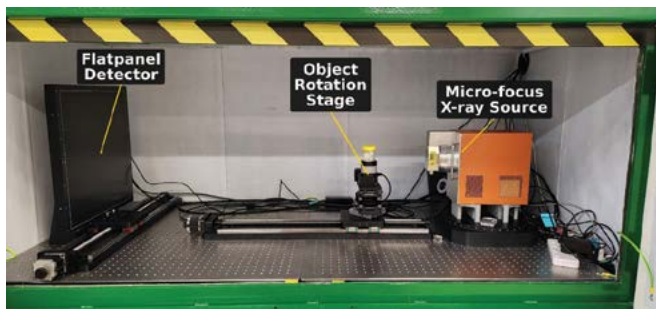


Figure 1: Experimental setup used for x-ray image acquisition.

AMIA provided a total of 52 mangoes which were imaged and then dissected to provide ground truth verification. The dissection results are shown in Table 1.

Results and Discussion

All 27 infested samples were clearly identifiable from the 2D projection images (see Figure 2), with the internal damage caused by pest activity producing distinct density variations within the mango seed. These distinct internal features present a recognizable pattern that distinguishes Mango Seed Weevil (MSW) infested fruit from controls, confirming that X-ray projection imaging captures sufficient internal detail to support reliable classification.

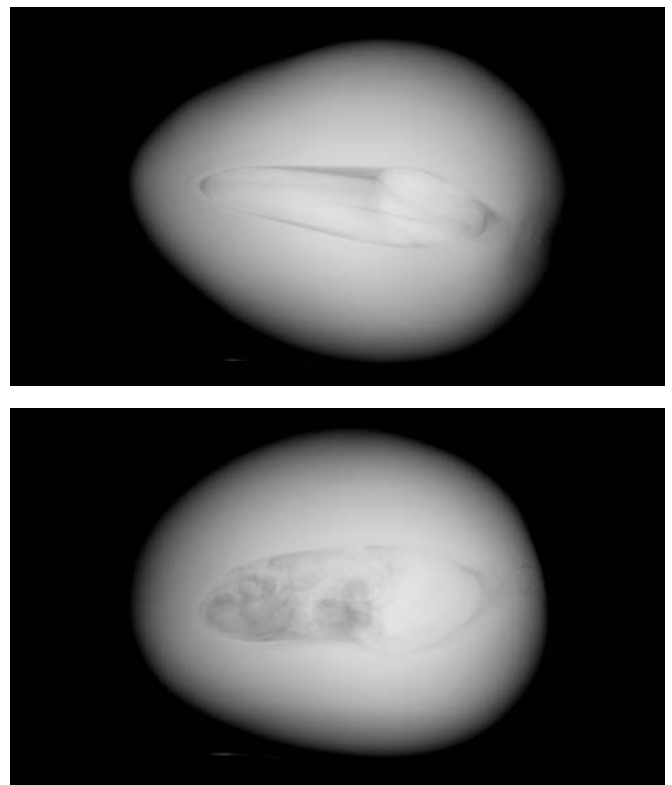


Figure 2 (Top): Control (no infestation) X-ray image. (Bottom) MSW Infested X-ray image.

To automate this discrimination, a convolutional neural network (CNN) was trained and evaluated using five-fold cross-validation under blind testing conditions. This approach partitions the dataset into five subsets, training on four while validating on the unseen fifth, then rotating through each combination to ensure every sample is tested without the model having encountered it during training. The CNN model returned an overall classification accuracy of 96.2% in correctly discriminating between pest-infested and control samples, demonstrating strong and consistent performance across the full dataset.

To automate this discrimination, a convolutional neural network (CNN) was trained and evaluated using five-fold cross-validation under blind testing conditions. This approach partitions the dataset into five subsets, training on four while validating on the unseen fifth, then rotating through each combination to ensure every sample is tested without the model having encountered it during training. The CNN model returned an

overall classification accuracy of 96.2% in correctly discriminating between pest-infested and control samples, demonstrating strong and consistent performance across the full dataset.

Category	Ground Truth (n)	Correctly Classified (5-fold CV)	Accuracy (%)
MSW infestation	27	27	100.0
Control (no infestation)	25	23	92.0
Total	52	50	96.2

Table 1: Performance of the CNN model in detecting internal mango seed weevil (MSW) infestation from X-ray projection images, evaluated using 5-fold cross-validation. Ground truth numbers were determined from dissection results.

Notably, the two incorrect classifications were both false positives, that is control samples that are predicted as infested, rather than false negatives. This error profile is particularly favourable in an automated detection context as an over cautious approach carries a far lower risk and cost than allowing genuinely infested produce to pass undetected. No truly infested samples went undetected.

In conclusion, this work presents a very promising proof of concept demonstrating the feasibility of x-ray imaging as an automated pest detection tool for the mango industry. The biggest limitation of this work is the size of the training data set, comprising of only 52 samples. While the results achieved on this dataset are promising and the five-fold cross-validation strategy employed helps mitigate this issue, it cannot compensate for the scarcity of data present, which will be the focus of future work.

Future Work

The most immediate priority is expanding the training dataset. The misclassifications observed in this study are primarily a result of the limited volume of training data, and a larger, more varied sample set would give the CNN a broader range of examples from which to learn, particularly in terms of natural variation in fruit size, density, shape and the appearance of infestation at different stages. Building on these results, development of a prototype system suitable for field evaluation would allow for this data to be collected and this approach to be tested under operational packhouse conditions.

Work is also ongoing to extend this to Queensland fruit fly (QFF, *Bactrocera tryoni*). Validating the imaging and classification approach against QFF infestation would broaden the method's practical relevance, allowing for the model to be advanced to a multi-class system capable of identifying the specific pest type present. This would allow the X-ray system to provide actionable information about which species is responsible for infestation, capability that could be used to support more targeted quarantine and treatment responses.

Acknowledgement

The authors would like to thank the Australian Mango Industry Association (AMIA) and the participating mango business for helping to organise and supply the mango samples used in this study.



For further information

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MORE THAN SKIN DEEP: Formulating Mango Blush

By Ms. Tayyaba Tariq, Dr. Bhagwat Nawade and Associate Professor Christopher Cazzonelli.

Hawkesbury Institute for the Environment, Western Sydney University, Locked Bag 1797, Penrith NSW 2751, Australia.

For Australian consumers, a red blushed mango signals ripeness, sweetness, and quality. For growers, it signals a premium product with higher market value. Fruit colour is a key sensory trait attracting consumer attention and purchase decision. Mango fruit blush is a complex trait, and commercial chemical spray products offer promise to improve colour development. But how much should be applied and what developmental stage? While chemical applications offer potential to improve fruit colour, scientific research suggests that mango blush is a complex trait. Fruit colour is influenced by the interaction between a cultivar's genetics, the stage of fruit development, environmental conditions and chemical signals. Understanding the interaction between these factors provides a framework of understanding – the Mango Fruit Blush Formula.

The Mango Fruit Blush Formula

FRUIT BLUSH =

Genotype x **Development** x **Environment** x **Chemical Signals**

Mango blush depends firstly upon the cultivar having the right genetics to develop blush under favourable conditions, referred to herein as “blush capacity”. Secondly, the fruit must be at the right stage of development; not too small, but not yet fully mature and ripe. Fruits within the canopy must also be exposed to sufficient light and have favourable temperature conditions. Finally, the fruit must be responsive to chemical signals, including hormones, soil nutrients, or minerals, that can also influence colour development. These factors work collectively rather than in isolation. If one component is missing, the others may not fully compensate, despite the fruit having strong genetic capacity to blush.

Genotype:

Does the cultivar exhibit blush capacity

A cultivar's genetic origin underpins its natural capacity to develop fruit blush, but genetics alone do not determine the final result. Fruit development, light exposure and chemical signals all influence how much blush a fruit will ultimately exhibit on the tree and is visible at the retail store. The correct combination of genes within a cultivar influences the production of anthocyanins – the natural antioxidant pigments responsible for the red-purple colour associated with mango blush. However, these pigments will only develop when environmental conditions are favourable. Light is critical, and a closed or dense tree canopy, or substantial shading can significantly limit blush formation.

In Australia, R2E2, Yess!, AhHa!, and Calypso® generally exhibit moderate to strong blush potential under favourable growing conditions. Kensington Pride can also develop an attractive colour but is often more sensitive to canopy management and seasonal conditions. For growers, this means that an exogenous chemical product or management practice that improves colour in one variety may not necessarily produce the same result in another cultivar due to variations in genes required to promote blush. A good guide towards better fruit colour management starts with understanding a cultivar's natural blush potential during development and across a range of environments.

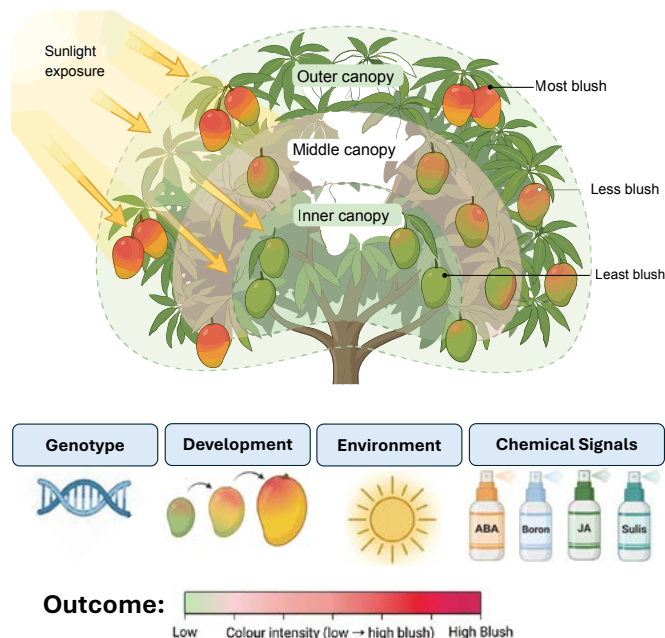


Figure 1. The Mango Fruit Blush Equation.

(A) Sunlight exposure and canopy position influence mango blush intensity, with outer-canopy fruit showing the most blush and shaded inner-canopy fruit showing the least.

(B) Mango blush depends on the interaction between genotype, development, environment, and chemical signals.

Development

Is the fruit stage right to respond

Fruit developmental readiness is one foundation to establish effective fruit blush. Young or immature fruits are not biologically ready to synthesise significant amounts of anthocyanin pigments responsible for red-purple colour, even when exposed to sufficient sunlight and the right genetics. Blush competence appears to develop as fruits enlarge and become physiologically mature. Further bursts of blush may also arise later during horticultural maturity and postharvest ripening, although these colour changes are often less pronounced than the blush formed on the tree. For growers, the message is clear: fruit colour management strategies are most likely to be effective when fruit have reached the appropriate stage of development. Understanding fruit physiology and maturity are just as important as having the right genetics and selecting the right chemical formula for boosting blush competence at the right time.

Environment:

Are the fruits exposed to direct light

Sunlight is the most powerful driver of mango blush, providing the cultivar has the genetic capacity to develop blush colour. Without sufficient direct light on the fruit surface, blush formation becomes limited. Anthocyanin pigments responsible for the red-purple blush are powerful and stable antioxidants, a type of stress pigment that helps to protect the fruit from the harshness of exposure to direct sunlight. Only fruits that perceive or receive direct sunlight for a period of time will blush. Fruit hidden inside a dense canopy receive little light and will

typically remain green or exhibit minimal blush. Canopy position is one of the strongest predictors of fruit colour at harvest. Canopy management practices that promote a more open tree architecture can significantly increase light transmission and boost the proportion of blushed fruits. Improved light transmission through selective thinning and reflective ground surfaces offers potential to enhance fruit blush. In other fruit crops, high temperatures can limit skin blush despite having a sufficient light environment. So perhaps there is a fine balance between light exposure and temperature when a chemical can signal a solid blush. For growers, canopy management may be one of the most effective and immediately available tools for improving consistent and uniform fruit colour.

Chemicals:

When, where, and how much to spray!

“Chemicals” refer broadly to products applied to influence fruit colour, including plant growth regulators (PGRs), foliar nutrients, and fertilisers. Products marketed as fruit blush enhancers should be viewed as amplifiers rather than simple on/off switches. They may increase anthocyanin pigment production and colour development, but only when the underlying biological system is receptive to change. In other words, the cultivar must have the genetic capacity to blush, the fruit must stage in development, and environmental light conditions must be highly favourable. For Australian mango growers, no product currently holds Australian Pesticides and Veterinary Medicines Authority (APVMA) registration or a known active permit specifically for mango blush induction. Internationally, plant hormones prohydrojasmon (PDJ; jasmonic acid derivative) and abscisic acid (ABA) remain the most scientifically supported compounds, with Israeli studies reporting improved red colour development on horticulturally mature fruit^{1, 2}. Ethephon, a synthetic derivative of the plant hormone ethylene, holds an APVMA permit for inducing flowering and enhancing ripening in mangoes, but is not registered for the direct induction of blush.

Nutrient-based products and fertiliser management may also influence mango fruit colour development. Some commercial nutrient products are promoted for improving fruit colour, although they may not appear in APVMA mango chemical lists if they are not registered or sold as agricultural chemical PGRs. For example, Sulis[®] by Levity Crop Science Australia is marketed with “Blush technology” and is promoted for improving fruit colour, brix, and maturity. It supplies molybdenum and boron in a specialised formulation, along with cell wall stabilisers, to support fruit maturation and colour development³; however, mango-specific research evidence remains unclear.

More broadly, mango soil nutrition guidance indicates that the fertiliser balance is critical, as excessive or poorly timed nitrogen and magnesium can reduce blush, cause soft fruit, and prevent fruit from colouring properly after horticultural maturity and during ripening⁴. Research in the Northern Territory revealed that high nitrogen application rates, such as 50 kg/ha, in mature Kensington Pride orchards can result in the fruit skin remaining green rather than developing an attractive blush over golden skin when fully ripe⁵. For growers, the key message is that chemical products and nutrition programs are most likely to

enhance fruit colour when the other components of the Mango Fruit Blush Equation are already in place. They should be viewed as one part of an integrated fruit colour management strategy rather than a standalone solution.

Key Messages For Growers

Fruit blush management is not a simple “spray and pray” decision; it is the result of a whole system decision. The genotype defines the upper limit of a cultivar’s potential to develop blush, the stage of fruit development opens potential when colour can develop, light exposure activates the stress response pathways driving the blush response. Chemical products and nutrition programs may enhance colour development, but only when these other factors are already in place. Consistent, vibrant fruit blush emerges only when all four components of the Mango Fruit Blush Equation work collectively together. Understanding how these factors interact can help growers make more informed decisions about cultivar selection, canopy management, nutrition and the timing of any colour-enhancing interventions.

The Mango Fruit Blush Formula provides a useful framework for understanding the factors that influence fruit colour development – a starting point to make mangos even more attractive. Grower observations and experiences will be important in testing and refining the blush framework under Australian growing conditions. Have you observed blush patterns in your orchard that support or challenge this model? Grower and breeder insights are highly invaluable. A/Prof. Christopher Cazzonelli and his team at Western Sydney University encourage growers and industry partners to share their observations, including the location, cultivar, stage of fruit development, effects of shading/light exposure, time of day, temperature conditions, management practices, chemical products trialled, and/or soil nutrient status using the link below. These observations will help us to build a more comprehensive formula for promoting mango fruit blush and ultimately support the development of farming strategies to boost fruit colour, a trait highly valued by consumers.



[Click here](#) or scan the QR code to fill out the **Mango Blush and Colour Development Survey form.**

Acknowledgement

We are working with growers, breeders and industry partners, including Dr Natalie Dillon and Dr Asjad Ali from the Queensland Department of Primary Industries mango breeding program. We aim to refine the Mango Fruit Blush Formula and identify practical and genetic approaches to control mango fruit blush in next generation commercial orchards. The Genetics for Next Generation Orchards (GNGO; AS23003) project is funded through Hort Innovation Frontiers with co-investment from Queensland University of Technology, the University of Queensland, Queensland Alliance for Agriculture and Food Innovation (QAAFI), Western Sydney University, Murdoch University, Adelaide University, and The University of Western Australia; Department of Primary Industries (Queensland), Department of Primary Industries and Regional Development (Western Australia), and Northern Territory Department of Agriculture and Fisheries; Bioeconomy Science Institute, CIRAD, AbacusBio; and contributions from the Australian Government.

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Genomic Insights into Mango Flowering



Fig 1: Dakshina Yadav, Stephanie Kerr and Asjad Ali collecting samples from mango trees in Mareeba

Authors: Dakshina Yadav, Dr Asjad Ali, Dr Brett Williams, Dr Lindsay Shaw, Dr Stephanie Kerr

Why flowering matters:

If you've been growing mangoes for a while, you already know one thing for sure, no two seasons are the same. Some years bring strong, even flowering and a good crop. Other years, flowering is patchy, spread out, or just not what you expected.

So, what's really driving this?

Dakshina Yadav, a PhD student at Queensland University of Technology, is focused on answering this question by looking at how climate, tree physiology, and genetics come together to control mango flowering. Flowering is the most critical stage in mango production because it directly determines yield. The number, timing, and uniformity of panicle emergence influences fruit set, harvest synchronisation, and ultimately market returns. Poor or irregular flowering is a major cause of yield instability across mango-growing countries, including Australia. In seasons with warmer winter night-time temperatures floral induction can be suppressed, leading to delayed, sparse, or even complete failure of flowering. In such cases, orchards may experience significant yield loss, often ranging from 30% to 80%, with negligible production in extreme vegetative years.

What drives flowering

In northern Australia, regions like Mareeba, Darwin, and Katherine experience very different seasonal patterns and mango trees respond directly to those differences.

From what we know so far:

- A long, dry winter with low temperatures (10-15°C) usually leads to better and more uniform flowering.
- A short or humid dry season often results in staggered or uneven flowering.
- Warm nights during the winter period can trigger new leaf flush instead of flowers.

- Different cultivars vary in their responsiveness to flower-inducing signals.

In simple terms, the tree is constantly "deciding" whether to grow leaves or produce flowers and that decision is heavily influenced by the weather.

The challenge: poor synchronisation

One of the biggest challenges growers face is when trees try to do both at the same time, producing new leaves while also flowering. This is referred to as poor synchronisation, and it can lead to uneven flowering across the tree, multiple flowering waves, fruit maturing at different times, and ultimately more complicated orchard management. Ideally, trees should pause vegetative growth, flower in synchrony, and then return to flushing after fruit set. But in warmer, more humid environments, that clean sequence doesn't always happen. While climate plays a big role, the real action is happening inside the plant.

Inside the tree: how genes control mango flowering

At the molecular level, mango trees use specific genes to regulate flowering. These genes respond to environmental signals like temperature, water stress (dry conditions), and day-to-day weather patterns. The tree only transitions into flowering mode when the weather conditions are favourable. If the conditions are not suitable, it continues to produce leaves instead. We are trying to understand how these signals are translated into flowering at the genetic level. The genetic control of flowering in mango involves conserved pathways similar to those found in other flowering plants. Key genes such as *FT* (FLOWERING LOCUS T), *SOC1* (SUPPRESSOR OF OVEREXPRESSION OF CONSTANS 1), *LFY* (LEAFY), and *AP1* (APETALA1) regulate the transition from vegetative to reproductive growth. *FT* is produced in leaves and triggers flowering at the shoot tip by activating downstream genes. In mango, the expression of these genes is strongly influenced by environmental factors, particularly temperature, with cool

conditions promoting flowering and warm conditions suppressing it. Understanding these genetic mechanisms is essential for improving flowering consistency and developing climate-resilient production strategies. To conduct this study, we have collected mango leaf and bud samples from Kensington Pride (KP), Yess! and Calypso (B74) trees from different regions and at different stages of growth and are extracting RNA from these samples in the lab. RNA provides a snapshot of which genes are active at a given time essentially illustrating what the tree is doing internally.

Why this research matters in a changing climate

This research isn't just academic; it has practical outcomes. A better understanding of flowering regulation can help to predict flowering timing more accurately, improve consistency across seasons, support better decisions around irrigation and growth management and help identify varieties that perform better under different climates. Previous studies have shown that low temperatures during the inductive period are critical for mango flowering in subtropical production systems and can significantly alter flowering intensity and panicle emergence depending on cultivar sensitivity.

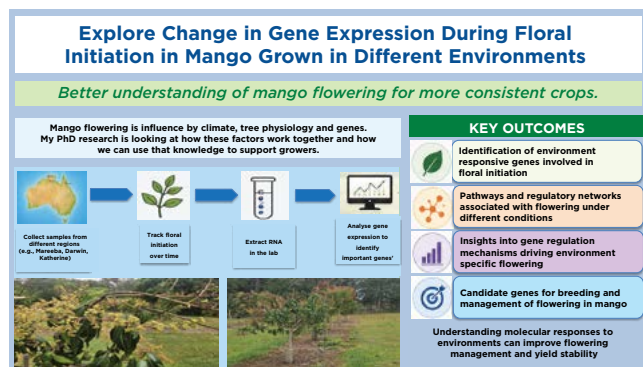


Figure 2: Project Overview: Experimental Design, Methods, and Key Outcomes.

As climate patterns continue to shift, understanding how mango trees respond becomes even more important. Mango trees don't just respond to one factor they respond to a combination of climate signals, internal biology, and timing. By understanding that system better, we can move closer to more consistent flowering and ultimately, more reliable crops.

Acknowledgement

This PhD research is a collaboration between Queensland University of Technology (QUT), Queensland Department of Primary Industries (QDPI), Northern Territory Department of Agriculture and Fisheries (NT DAF) and The University of Queensland (UQ) and supported by industrial partner Niceforo Farms. This research is part of the Genetics for Next Generation Orchards project (AS23003) which is a five-year, Hort Innovation-funded Frontiers program with contributions from the Australian Government aimed at improving the productivity, efficiency, and profitability of Australian orchard systems. This project is developing tools to expedite the development of five tree crops including mango, with the goal of enhancing productivity and profitability in the next generation of orchard systems.



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Mulching trial explores impact on lenticel spotting and post-harvest disease

Authors: Dale Bennett (Horticulture & Forestry Science, Qld Department of Primary Industries) and Marine Empson (AMIA).

A demonstration trial at FAVCO Goldpack in Mutchilba has investigated whether row-applied mulch could reduce lenticel spotting in Keitt mangoes, while also addressing a key industry concern around potential impacts on post-harvest disease.

Lenticel spotting remains a common skin defect that can affect mango appearance and packout rate. While mulch offers potential benefits such as improved soil moisture retention, reduced evaporation, weed suppression and increased organic matter, some growers have been cautious about adoption due to concerns that retaining moisture and organic material near trees may increase disease pressure, particularly stem-end rot.

The trial, conducted through the *Extension to build innovative culture and capability in the Australian mango industry* project (MG21002), compared mulched and non-mulched rows in a commercial Keitt block. Fruit from both treatments were assessed with and without the standard post-harvest fludioxonil hot dip to evaluate the combined effects of mulch and disease management.

Methods

Six full-length rows were split lengthwise, with one half of each row receiving straw mulch and the other half left untreated as a control. Due to additional mulch availability, a further half-row was also included in the mulch treatment. Mulch was applied immediately after flowering at approximately 3-4 kg/m², providing continuous ground cover through the fruit development period.

All images show straw mulch applied to rows of a Keitt block.



Two representative trees were selected within each section, and eight fruit per tree were harvested at commercial maturity. A total of 208 fruit were assessed using a 2 x 2 treatment design comparing:

- mulched vs non-mulched orchard rows; and
- fruit receiving the standard fludioxonil hot-dip treatment vs untreated fruit.

Fruit were ripened under controlled conditions and assessed at harvest, and two, three and four weeks after harvest for lenticel spotting and post-harvest diseases including stem-end rot, pepper spot and body rot using the Mango Quality Assessment Manual rating system.

Key findings

The first season of results showed that mulch did not provide a measurable benefit for reducing lenticel spotting. However, lenticel spotting pressure was relatively low during the trial, with most fruit showing only mild symptoms and remaining within Class 1 specifications. Additional seasons of monitoring are needed to determine whether mulch provides benefits under higher-risk conditions.

The trial provided useful insights into disease management, with the standard hot dip having the greatest impact on post-harvest disease outcomes. At the final assessment, the proportion of disease-free fruit increased from around 6-8% in undipped fruit to 65-67% in dipped fruit.

Importantly, mulching did not increase disease incidence in hot-dipped fruit, supporting the view that growers using recommended post-harvest disease management practices can adopt mulch without compromising fruit quality. A higher level of stem-end rot was observed in mulched, undipped fruit, although this difference was not statistically significant and requires further investigation.

Disease incidence at final assessment (2 Mar 2026)

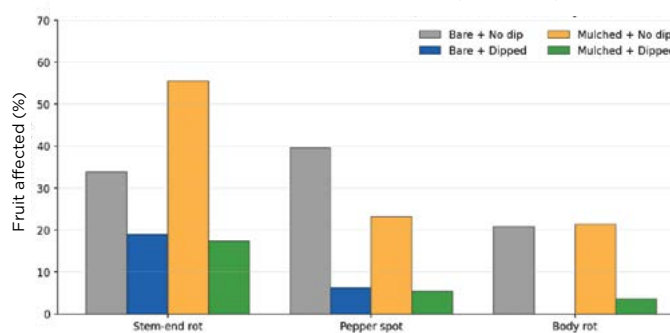


Figure 1. Incidence of the three principal disease types (stem-end rot, pepper spot, body rot) at the final assessment, by treatment group. Hot dipping markedly suppressed all three diseases. Note the elevated incidence of stem-end rot in the mulched-and-not-dipped group (55.5%) relative to the bare-and-not-dipped group (33.8%); this difference was not statistically significant in the pairwise comparison but is large enough to be worth noting.

A second season of monitoring is being considered to further assess seasonal effects and determine whether any impacts become more evident over time.

Acknowledgements

The trial was conducted by Queensland Department of Primary Industries and AMIA in collaboration with FAVCO Goldpack, with support from Nutrien Ag Solutions.



Participants assessing mangoes at the DPI sensory facility.

PHOTO CREDIT: PHOTOELEMENTS

DO CONSUMERS TASTE WHAT EXPERTS DO?

How Sensory Science is Helping Breed Australia's Next Generation of Mangoes

Article provided by Ishita Pramanik (Consumer and Sensory Scientist) and Philippa Lyons (Principal Scientist), Consumer Intelligence Team, Queensland Department of Primary Industries.

When consumers bite into a mango, do they notice the same things that trained sensory experts do? To answer this question, our research compared two powerful sensory science approaches: trained panel descriptive analysis, the gold standard for precise sensory measurement carried out by specially trained assessors, and the consumer-based Rate-All-That-Apply (RATA) method, which captures how everyday consumers perceive and describe a product. The results revealed both remarkable agreement and some surprising differences.

The Consumer Intelligence Team at the Queensland Department of Primary Industries (DPI) has been working with the Queensland Mango Breeding Program (QMBP; formerly the National Mango Breeding Program, NMBP) team based in Mareeba, Far North Queensland, on a multi-year study to understand how sensory characteristics and consumer preferences relate to mango genetics, providing valuable insights to support mango breeding. The ultimate goal is to develop superior mango varieties that not only perform well agronomically but also deliver the flavour, aroma and texture that meet consumer expectations and encourage repeat purchases.

The 2023 study (*Sweet News for Mango Lovers in Australia, Mango Matters, Autumn 2023, Volume 51*) showed that Australians consistently rated NMBP varieties among the highest-performing of the 10 varieties evaluated. Building on these findings, the team assessed a further 10 varieties in 2024, including DPI breeding program selections (Yess!, Ah-Ha! and WS4), Southeast Asian varieties (Xoài Cat Thom, Carabao and Sampee Seedling), Indian varieties (Padiri and Bangampalli), an Israeli variety (Israel) and a Floridian variety (Orange Sherbet).

Of the varieties tested, the DPI breeding program selections performed exceptionally well, receiving high scores for appearance, aroma and overall liking. In particular, Yess! and Ah-Ha! varieties stood out for flavour and texture, suggesting they have strong potential to become everyday consumer favourites.

Trained sensory panellists first applied an internationally recognised sensory descriptive analysis method¹ to identify and define key sensory characteristics of each mango variety, creating a sensory *lexicon*² – a standard vocabulary used to consistently describe sensory attributes. From this, a set of broadly discriminating attributes were



PHOTO CREDIT: PHOTOELEMENTS

Preferred mango varieties were characterised by attributes such as orange, stone fruit, coconut aromas and flavours, a sweet taste, and a juicy texture.

selected for consumer assessment. Consumers subsequently evaluated the mangoes using the RATA methodology³, allowing them to describe the characteristics they noticed naturally during the eating experience.

The result? A story of both alignment and divergence.

Both testing approaches agreed on the key sensory traits that drive consumer liking. Preferred mango varieties were characterised by attributes such as *orange, stone fruit, coconut aromas and flavours, a sweet taste, and a juicy texture*. In contrast, lower-rated varieties were associated with *pine-like, vine-like and raw vegetable notes*, along with a *bitter taste*. This strong agreement demonstrates that rapid consumer methods such as RATA can reliably identify the core sensory profiles that matter most to consumers, providing valuable insights with less time and expense than intensive trained panel assessments.

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Nine of ten mango varieties assessed in the 2024 study.

However, it was the differences between the two approaches that provided the greatest insight.

The trained panel detected a range of subtle but complex attributes such as *pink* flesh colour, *confectionery*, *passionfruit*, *banana*, *pineapple* and *floral* notes, as well as *salt* taste and *smooth* texture, that were rarely identified by consumers. Rather than evaluating every individual sensory characteristic, consumers tended to focus on the features that most influenced their enjoyment of the mango. Strong positive attributes stood out, while more subtle background characteristics, such as *floral* or *fermented* notes, were often overlooked.

In other words, trained sensory panels measure products, while consumers interpret the overall eating experience, blending sensory perception with expectation, emotion and personal preference.

For industry, this distinction matters.

If the goal is selective breeding for enhanced genetics and sensory traits, trained panels remain a powerful resource. They provide the sensitivity and consistency needed to detect small but meaningful differences. However, if the goal is understanding market success, consumer-led approaches like RATA offer a more direct pathway by capturing what people notice, what they value, and ultimately, what drives their choices.

Rather than viewing these methods as competing approaches, our findings suggest they are complementary tools. Together, they provide a more complete picture by linking objective sensory properties with subjective consumer perception.

In the case of mangoes, this dual approach not only helps breeders differentiate varieties but also identify the sensory characteristics most likely to influence consumer acceptance and commercial success. In an increasingly competitive fresh produce market, these insights will help breeders develop varieties that not only meet technical specifications but also resonate with consumers and encourage repeat purchases.

Acknowledgement

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Disclaimer: The above information is sourced from research conducted by the DPI Consumer Intelligence team. The Queensland Department of Primary Industries and Horticulture Innovation provide the above information as a guide only and take no responsibility for the performance of the varieties on individual farms.

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