

MANGO MATTERS

SEPTEMBER 2018 / VOLUME THIRTY-THREE

PRE-SEASON ROADSHOWS IN FULL SWING

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Good things come
to the those
who wait

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The Asia Pacific
Mango network is
launched

PAGE 16

Transforming
the future of
mangoes

PAGE 18



SPRING
ISSUE



Lady Jane
MANGOES

- > Brilliant red blush
- > Rich sweet flavour
- > Small seed
- > Harvests earlier than KP
- > Excellent shelf life that is longer than KP
- > Robust and handles transport better

We have developed two new mango varieties (RA17 and R10-8) with superior flavour and appearance. Their robust quality can withstand all aspects of the supply chain giving a significantly better shelf life. Both varieties will be marketed under the Lady Jane brand and will be available in semi-commercial quantities this October.

These varieties were developed in partnership with an expert mango breeder in the Northern Territory, a cross of Irwin (female) and R2E2 (male). We hold the plant breeders rights globally and are looking for mango growers to participate in the planting program. If you are interested in planting these varieties or would like more information, please contact Richard Byllaardt: richard.byllaardt@nutrano.com.au or phone 0418 807 636.

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nutranō

Grow Better

On your marks,
get set....



...GO!

Retailers and consumers across the country are hungry for mangoes, and never has the industry been more perfectly poised to delight their appetite.

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AMIA
Australian Mango Industry Association Ltd.

AUSTRALIAN MANGOES

Hort Innovation
Strategic levy investment

MANGO FUND

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Good things come to those who wait

The Asia Pacific Mango Network is launched

Transforming the future of mangoes

Shedding some light on mango supply chains into Asia

Last field season for the Magpie Geese on Mango Orchards Project

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www.freshrepublic.com.au*

WANT TO CONTRIBUTE?

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

CEO'S REPORT



Robert Gray
Chief Executive Officer, AMIA

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What is the enabler which allows an industry to create its own future verses taking what is dished up to it?

This season will be my 29th mango season. Over that time I have seen many individual businesses excel; achieving great results in their own right. I have also seen many high quality individual mango businesses do everything within their own business extremely well but still struggle to achieve their financial and business goals because of challenges that were outside their control.

I have also seen great research being done only to not get implemented. I have seen enthusiasm from marketers and retailers to invest in marketing only to be disappointed by a lack of quality supply arriving on time and I have seen excited loyal mango consumers feeling disappointed that their last mango experience did not live up to their high expectations.

How things are changing.

We have recently conducted preseason roadshows in Darwin, Katherine, Kununurra, Bowen, Ayr and Mareeba with roadshows in Central Queensland, Carnarvon and Gingin will follow over the coming months. To date, we have seen an overwhelming attendance at the roadshows and I am encouraged by the extent of engagement we have with a vast cross-section of stakeholders within our industry. We are now seeing consistently high levels of participation in industry projects from growers, researchers, service providers, government and retailers. This participation and engagement is not just at the preseason road shows but in our week to week and

“I encourage you all to continue to engage in our mango industry, participate in industry projects, meetings, roadshows and in one-on-one conversations about how we can, together, drive this industry forward.”

- Robert Gray

day to day activities as an industry. It's this participation, beyond our immediate businesses and organisations, collectively working towards the overarching industry objectives that is giving us real traction in delivering on our goals and which is enabling us to create the future we want for our industry rather than just taking what is dished up to us. It is clear we are on an upward trajectory to creating our future and delivering on our ambitious goals stated in our strategic plan. We have a clear strategy relating to what we want to achieve. Our plan is owned by industry and by effectively actioning a broad range of projects we are enabling the plan to be delivered.

Dealing with issues outside our direct organisation is often difficult and sometimes contentious as the benefits are often indirect and not immediate but as we have seen when we look at what has been achieved over the last 3 years, the results are coming our way.

I encourage you all to continue to engage in our mango industry, participate in industry projects, meetings, roadshows and in one-on-one conversations about how we can, together, drive this industry forward.

I urge you to get involved with our forecasting project to ensure accurate, timely information of crop flow is available for all stakeholders. I implore you to take advantage of our IDO's dry matter testing service to strengthen your decision-to-pick arsenal and help maximise the eating experience of our end consumers. I encourage you to participate in the Grower Market Tour and Messtival experiences to gain an

in-depth understanding into what happens to your product post farm gate and how your management decisions can impact on the supply chain through to the end consumer.

Get involved in the National Mango Breeding Program varietal commercialisation and evaluation program to see what genetic improvements are in-store. Communicate regularly with your local Australian Mangoes director and regional organisations - giving and receiving feedback on activities will ensure your industry bodies are well informed. Take advantage of our marketing engagement program, an important collaboration with our supply base, to ensure your retail, wholesale and export businesses reach their full potential and you can maximise the value of your crop.

Finally, get involved with our Leadership Exploration And Development (LEAD) program to assist growing capacity amongst our young leaders. We have young professionals joining us on this journey and across the regions we are seeing increased investment in production, packing and supply chain infrastructure which are all enablers to realising our goals.

I look forward to engaging with you all over this mango season and am very much excited about joining with you all at our conference, in Darwin next May, where we can come together to collectively collaborate, celebrate and continue to create this exciting industry.

CHAIRMAN'S REPORT



Ben Martin
Chairman, AMIA

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The 2018 mango season commenced with a good flowering and fruit set across the regions. Early predictions indicate that there will be good production this season, highlighting the need for growers to be vigilant in providing their estimates and timing of crop forecasts. This timely information is essential to the marketing strategy and assists Treena Welsh in her role of supply chain engagement for this season.

Australian Mangoes has appointed two Industry Development Officers; Sarah Hain (NT) and Marnie Empson (Qld). The IDO's are available to assist growers on a number of matters including on-farm maturity testing with the Australian Mangoes F-750 meters in the lead up to harvest. I encourage growers to use this service which strengthens our engagement in the regions and ultimately assists in ensuring the quality of mangoes meets our consumer's expectations.

In the Winter edition of Mango Matters, Robert Grey highlighted the subject of biosecurity within our industry. I believe

“Early predictions indicate that there will be good production this season, highlighting the need for growers to be vigilant in providing their estimates and timing of crop forecasts.”

- Ben Martin

there is a need for all participants within our industry to understand the biosecurity risks posed and I encourage growers to embrace and participate in providing a strong biosecurity surveillance network across our regions.

For those growing regions in the stages of fruit set, I urge you to understand and monitor your crop's nutrition requirements. There is reference material, based on good research work, which sets crop nutrition values. Outcomes from this monitoring may lead to improved fruit quality and production which ultimately links directly to our industry's productivity.

All the best for the 2018 mango season.

Save the Date! AUSTRALIAN MANGOES 12TH BIENNIAL CONFERENCE

14 TO 17 MAY 2019

Australian Mangoes is pleased to announce the date for our 12th conference to be held from the 14-17 May 2019, in Darwin NT.

**AUSTRALIAN
MANGOES**[®]



DIRECTOR REPORTS

FAR NORTH QUEENSLAND & NORTH QUEENSLAND



David Morcombe
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Firstly, I would like to say thank-you to my fellow board members who recently welcomed me onto the board.

It was good to catch up with all in the attendance at the Kununurra / Katherine / Darwin roadshows. I think appointing the new Industry Development Officers is a great move and it was good to see the positive reaction to the increased capacity of Robert's team at those meetings.

There will be a workshop in the third week of November as a follow up to the last workshop we had at Canning Vale in February, details to come. There has also been some discussion and a phone hook-up, initiated by CCI WA and DPIR, about an initiative to facilitate export of R2E2 to China, this is ongoing.

The regional updates are:

SOUTH WEST: After a dry start to winter it seems to have been raining since July, with record rain in August and a wet start to September. Hopefully sprayers have been busy. Flowering is less than usual for this time of year with some growers already predicting a light crop, but maybe there will be a later flowering?

CARNARVON: Better Winter rainfall has contributed to the three good river flows. The aquifers are recharged and it is looking like no water restrictions will be applied during the coming season. Strong flowering for varieties other than KP, which is patchy, means the season is off to a good start. This season should be the first since the 2015 cyclone where there is no impact on crops as some varieties have taken a while to recover fully.

MILDURA REGION: The last couple of months have seen damaging frosts. The trees have buds now and flowering is expected around October / November.



John Nucifora
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Hi all, well we are looking down the barrel of another season. Flowering was very strong and the fruit set so far is favourable, despite the cool weather. We hope that it's a stronger season than last year. Some of my growers said they would like to forget the 2017/18 season.

In August I attended the Pre-season roadshows in Darwin and Katherine and there would have been 80 to 100 people in each region. It was great to see this sort of attendance. At this stage I'm hoping we can break record numbers in far North Queensland when we host the roadshows in September.

I am very impressed with the work Samantha and Marine are doing in my region with the capacity building project. Marine is very enthusiastic about mangoes and I have no doubt her performance will be 100 percent. I welcome both our new IDO's, Marine and Sarah.

Let's hope the weather is kind to all regions and I wish all the very best for 2018/19 season.

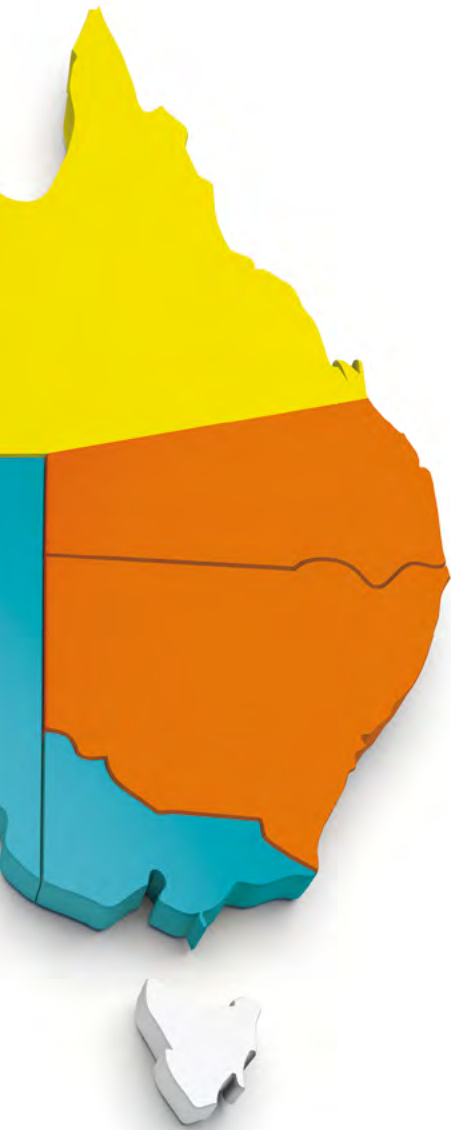


Raymond Courtice
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The 2018 flowering has been superior in the Dimbulah/ Mareeba region, however the low temperatures we experienced during fruit set are a concern on grower's minds. Now, as temperatures rise, the availability of water and its impact on fruit set is also of concern.

Harvest looks set to kick-off in mid to late November with a bumper fruit set on the KP's and R2's. The Calypso and Honey Golds are on track for harvest in early December with great fruit sets as well. It will all come down to the fruit drop.

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NORTHERN WESTERN AUSTRALIA & NORTHERN TERRITORY



Gavin Scurr
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After a winter with plenty of cool mornings the flowering on KP's in Katherine has been disappointing. The other varieties have flowered much better and at this stage are looking like holding a good crop. KP's however will be well down on the last couple of seasons. The cool mornings which lasted until late August have been a concern and I suspect will cause a larger

“It was pleasing to see so many people from across our industry make the effort to attend the roadshows held in Kununurra, Katherine and Humpty Doo. There was a very positive vibe across the group which I think shows that we are an exciting industry that is heading in the right direction.”

- Gavin Scurr

fruit drop than we'd like. When writing this report in early September, the drop was currently taking place on most farms so it will be interesting to see what crop we end up with.

It was pleasing to see so many people from across our industry make the effort to attend the roadshows held in Kununurra, Katherine and Humpty Doo. There was a very positive vibe across the group which I think shows that we are an exciting industry that is heading in the right direction. The roadshows are an important part of ensuring alignment across the industry as we start the season. They are also an opportunity for you to speak with AMIA staff and directors about the issues you are facing in your business.

I'd also like to welcome our 2 new Industry Development Officers to our industry. I got to spend a few days with them in the NT last month and found their approach and enthusiasm refreshing. Although they don't have a mango background they are keen to learn and from my experience, willing to ask thought provoking questions. Please invite them out to visit your farm and help us build another important resource for our industry.



Han Shiong Siah
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It's the start of the mango season for the Northern Territory with many mango orchards harvesting mangoes now. It has been a difficult season so far with a large number of traditional varieties either underperforming or having delayed flowering.

NT Farmers recently announced Northern Territory's Sweetest Jobs campaign to promote local workers to enter jobs in horticulture. The program is here to provide long term employment to local employees on farm and I hope the campaign is a success. Strengthening our workforce will help us to grow our industry.

From an export point of view, it is great to hear that we now have so many direct flights out of Darwin to Asia; including the recent announcement of QANTAS Freight stocking a wide body freighter once a week to Hong Kong. At the time of writing this report, I am aware of one and half air pallets of mangoes exported on one flight. With the recent announcement of the major development of the cold storage hub and possible construction of a vapour heat treatment facility our access to markets will continue to improve.

In August I had the opportunity to travel to the Pre-season Roadshows in the Northern Territory and Kununurra. Kununurra's inaugural pre-season roadshow had a good turnout hosted by Geoff Warnock and Quinten Parker. The attendance at Katherine was substantially larger than it has been previously with over 80 people turning out. The Darwin roadshow followed close by with similar numbers. Many topics were touched on, including; marketing, levy funded research; such as nitrogen research and the study of the genetics of flowering. There was great representation from two major retailers with a couple of interesting presentations from both Coles and Woolworths.

In closing, I would like to welcome two new faces to the AMIA team; Sarah Hain, our local IDO for the NT/WA region and Marine Empson, the Queensland IDO.

I wish all the growers the best for their season ahead. It will be a great #200daysofmangoes.

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DIRECTOR REPORTS (cont'd)

NORTHERN WESTERN AUSTRALIA & NORTHERN TERRITORY



Geoff Warnock
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KUNUNURRA: This region has experienced an exceptionally mild dry season to date with the night temperatures staying low which has in turn created a situation where the mango trees have been continually pushing out flower since the first week in May. As a result, on the trees, there is fruit ranging in size from, almost ready for picking, graduating down to pea sized product. It is however, usually the first week in September that the first 40 degree days occur and this should put a stop to anymore flowering. Even so, the season is shaping to be a long drawn out one which could run for 6-8 weeks, or more.

In early September we had a visit by Sarah Hain our regional IDO, who brought with her the NIR gun. The result of the fruit dry matter tests shows the season should be underway in approximately the first week in October.

Most growers are in the process of getting ready to start picking and endeavouring to arrange transport to get the fruit to the markets. Every indication is that it may not be as good a season as initially thought but still better than last couple have been.



SOUTHERN QUEENSLAND & NEW SOUTH WALES



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With the NT season ramping up, the CQ region is just starting to get fruit set. Weather across the region has been dry with only a small break coming in the form of wide spread rains in the last week. Hopefully the dry weather has aided in keeping pest and disease levels low.

Last year saw a bumper crop for most growers and with strong flowering across the region this year, it is shaping up to be another good one. Frosts and erratic

night temperatures may however, impact the other overall fruit set. The dry weather could also play a role in reduced crop volumes if trees have been feeling the pinch.

This year's Roadshow will be held in Bundaberg and I strongly encourage all growers to attend. It is not only a great opportunity for growers to catch up on what is happening in the industry but also an excellent networking event. Please keep your eyes peeled for event time and location details.

As the busy season starts to ramp up, I would also like to remind growers about the importance of Work Place Health and Safety. Harvest can be a hectic time with new staff coming and going from farms regularly. It is very important that growers take the time to train staff and look after their safety. The AMIA has Working with Mangoes Safety hand outs available should you require them. Remember – giving workers a safe and happy experience will ensure they come back next year or tell their friends to come in the future!

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AMIA AND INDUSTRY NEWS

Grower Market Tour

The Australian Mango Industry will be hosting the 2018 Grower Market Tour in Sydney from November 30th to December 3rd.

This event is a highlight in every mango season and growers from across the country, from all regions and all varieties are encouraged to attend.

The tour, now in its fifth year will provide growers with a deep understanding of the industry marketing plan and just what it takes to create an insatiable appetite for Australian Mangoes.

The three day event will cover all aspects of the supply chain and promises to be full of learnings and rich with insights, as well as providing some great networking opportunities.

The tour will give you the opportunity to see & hear things you wouldn't normally be exposed to; to go behind doors you wouldn't ordinarily walk through; and to share in conversations you wouldn't

otherwise have. It promises to give you a much greater understanding of just what it takes to market a great mango experience.

You'll visit the Sydney markets, and meet with wholesalers and exporters, be guided through the distribution centres of major retailers, 'shop' for mangoes across the full range of retail formats including Aldi, Coles, Costco, Green Grocers, Harris Farm Markets, IGA, and Woolworths, and experience all the energy and excitement of the Mango Mess-tival.

Now in its seventh year, Mess-tival is the industry's signature event, held on the first Sunday in summer on Australia's iconic Bondi Beach. The day is an upbeat festival

of all things mango, a fun-filled event where growers get to share their passion and tell their stories whilst introducing consumers to the taste of their own grown varieties.

You'll be amazed as thousands of Aussies flock to Bondi with togs and towels, eager to have their first 'official' taste of summer, your deliciously sweet & juicy Aussie Mangoes. Don't miss this extraordinary opportunity.

**REGISTER NOW
FOR A SEAT ON
THE BUS!**

Call Treena Welch,
Australian Mangoes
Marketing Manager, on:

0417 001 253

**SEATS ARE
LIMITED—so
don't miss out!**



Pre-season Roadshow update

The 2018 pre-season roadshows have begun in earnest. Roadshows have been held in Kununurra, Katherine, Darwin, Bowen, Ayr and Mareeba. Australian Mangoes has been delighted by the turn-out and would like to thank the hundreds of participants who have attended meetings to date.

These events are designed to provide growers and industry stakeholders with the latest R&D and marketing updates but most importantly they are a powerful platform for networking and engaging with people from across the industry. The meetings have included presentations from Australian Mangoes, Plant Health Australia, national retailers, relevant State and Territory Departments of Agriculture, Steritech and GS1. Participants have been shown how growers, retailers, wholesalers, exporters and service providers are collaborating to create sustainable and profitable growth for the mango industry.

Australian Mangoes would like to thank each of our hosts; Quentin Parker, Nutrano, Ben and Ash-lei Martin, John and Debbie Nucifora for hosting the events as well as Geoff Warnock and the NT Farmers Association for their assistance with the organisation and a special thank-you to all the speakers for their time and effort.

The last three roadshows of the season will be held in Bundaberg, Carnarvon and Gin Gin, WA.

For further information or to register for an upcoming event, please don't hesitate to contact us on (07) 3278 2755.

The last three roadshows of the season will be held in Bundaberg, Carnarvon and Gin Gin, WA.





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MARKETING

On your marks, get set....

As we finish the season 'warm up' and move to the starting line of the 2018 Mango Marathon the anticipation and excitement is palpable! Retailers and consumers across the country are hungry for mangoes, and never has the industry been more perfectly poised to delight their appetite.

Over the last four years, as volumes have ramped up, retailers have launched extraordinary campaigns giving mangoes front and centre stage with the full support of their marketing arsenal. These highly visible campaigns, coupled with our ability to provide an accurate forecast and a consistently good eating experience, have fuelled Australia's appetite for mangoes and kept consumers coming back again and again without devaluing price.

During the past couple of months, roadshows, workshops and planning meetings have been conducted in growing regions, retail head offices and at Asia Fruit Logistica; aligning stakeholders to the industry plan; 'the wheel of velocity and momentum' and reminding us that our individual success is reliant on our unified collaboration. We are brothers in arms and moving as one to the beat of the crop underpins our individual success.

At the beginning of any great race there is always a sense of nervous anticipation and so it is with the beginning of a mango season. As you come to the starting line prepare yourself to stay the course and go the distance. Your forecast makes a difference and your Dry Matter really does matter.

ENJOY YOUR RACE!



...GO!

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RESEARCH & POLICY

Good things come to those who wait

Ebony Faichney

Queenslander Rai Bin's newly planted hybrid mango trees currently represent the largest commercial plantings of three new varieties in Australia – but it's been a long time coming.

The National Mango Breeding Program (NMBP) varieties 1201, 1243, and 4069 first caught Rai's eye at a Department of Agriculture and Fisheries (DAF) field day eight years ago.

"These new varieties have an excellent flavour similar to Kensington Pride," he said.

"But they have higher and more consistent yields, a more attractive red skin colour (blush) and better post-harvest fruit quality."

Rai has now planted over 2000 of the new varieties on his Mutchilba property, near Mareeba, as part of the Australian Mango Industry Association (AMIA) commercial evaluation of the new hybrids.

DAF mango breeding program leader Dr Ian Bally said the three varieties Rai has planted were selected for their high yields, excellent appearance and flavour, and early season cropping, which make them competitive.

Rai is looking forward to seeing the first crop on his trees in December 2021.

"They are a beautiful looking fruit, you can't miss the red blush on them," he said.

"If they become well accepted with consumers and are financially viable to grow, I would seriously consider replacing all my existing Kensington Pride trees over time. As with other horticulture industries, variety change is something which will inevitably occur."

The new varieties are the result of the hard work conducted by plant breeders from across DAF, Department of Primary Industry and Resources (Northern Territory), Department of Primary Industries and Regional Development (Western Australia) and the Commonwealth Scientific and Industrial Research Organisation (CSIRO), who are dedicated to producing quality varieties for commercial use.

The Queensland breeding program is continuing to develop new varieties for the future mango industry with improved productivity, fruit quality, disease tolerance and smaller tree size.

Growers interested in seeing the new varieties first hand can contact Mareeba-based Development Horticulturist Ebony Faichney on 0491 212 948 or at ebony.faichney@daf.qld.gov.au.





Continued page 15



Growers interested in participating in the national AMIA evaluation trials with these three new NMBP variety trees (minimum of 500 trees per variety) can contact AMIA's Samantha Frolov on 0400 810 365.

Mareeba-based Department of Agriculture and Fisheries' Principal Horticulturist Dr Ian Bally standing with mango grower Rai Bin in his new planting of variety NMBP-1243 at Mutchilba, Queensland.

QUICK FACTS OF THE NEW NMBP VARIETIES:

	Origin	Avg. Fruit Weight	Colour	Flavour	Season	Tree Canopy	Yields	Bearing
NMBP 1201								
	Irwin x Kensington Pride	361g	Soft red to dark red blush on yellow background	Kensington Pride with slight Florida tang flavour	Early-mid season maturity – similar to Kensington Pride	Medium vigour, compact dense canopy	Medium-heavy yields > 15t/Ha/yr predicted	Tendency for biennial bearing
NMBP 1234								
	Irwin x Kensington Pride	507g	Strong red/pink blush on pale yellow background	Classic Kensington Pride flavour	Early maturity – 2-4 weeks before Kensington Pride	Medium vigour, open canopy	Medium-heavy yields > 15t/Ha/yr predicted	Consistent year-to-year yields
NMBP 4069								
	Van Dyke x Kensington Pride	378g	Soft pink/red blush on yellow background	Kensington Pride with slight Florida tang flavour	Early-mid season maturity – Similar to or slightly later than Kensington Pride	Medium vigour, compact dense canopy	Medium-heavy yields > 20t/Ha/yr predicted	Tendency for biennial bearing
Kensington Pride								
	Natural selection at Bowen (circa 1890)	384g	Yellow on green background	Classic Kensington Pride flavour	Early-mid season maturity	High vigour, open canopy	Low-medium yields 10t/Ha/yr average	Biennial bearing common

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The Asia Pacific Mango Network is launched

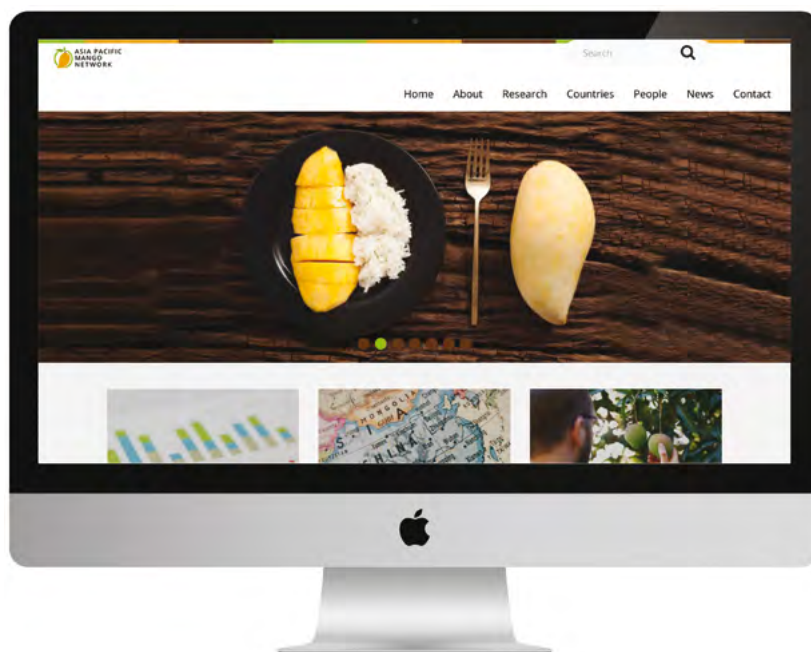


Geoff Dickinson

A new website (apmangonet.org) has been developed to connect researchers engaged in the production and trade of mangoes in the Asia-Pacific region. This new site provides a platform to share research outcomes and allow collaboration between research centres, institutions and supply chain stakeholders.

Our newsletter, *Simply Mango*, highlights important developments in the program. The first newsletter for the program has been loaded to the website and is now available for viewing.

The site, newsletter and an associated Facebook page are key outputs of ACIAR's Mango Agribusiness Research Program. The program is being led by GriffithAgribusiness, Griffith University, and funding is provided by the Australian Centre for International Agricultural Research. This program has a broad development goal to assist mango farmers and their communities in Australia's partner countries (Cambodia, Indonesia, Myanmar, Pakistan, the Philippines and Vietnam) to derive greater income and livelihood benefits from the production and trade of mango. The collaborating institutions include: Griffith University; Department of Agriculture and Fisheries, Queensland Government; The University of Adelaide; Chinese Academy of Tropical Agricultural Sciences and South China Agricultural University, South China Botanical Garden, CAS.



The associated research projects in the program include: Mango Information, Mango Markets, Mango Biosecurity and Mango Quality, which together have a shared goal of improved understanding of the China mango market. Together the research teams are now halfway through this exciting endeavour.

Further information can be obtained from Prof Robin Roberts at GriffithAgribusiness, Griffith University, robin.roberts@griffith.edu.au or Dr Geoff Dickinson at Department of Agriculture and Fisheries, Queensland Government, geoff.dickinson@daf.qld.gov.au

Mango Agribusiness researchers (L-R) Prof Daryl Joyce (Australia), Dr Emma Ruth Bayogan (Philippines), Dr Zainuri (Indonesia) and Mr Som Bunna (Cambodia) inspect imported mangoes at a marketplace in Guangzhou, China.

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Transforming the future of mangoes

Bridie Carr

New intensive mango management systems including high-density and trellis designs are currently being trialled by the Department of Agriculture and Fisheries in Queensland (DAF) in both the 'Small Tree High Productivity Initiative' (STHPI) and the 'Cyclone Resilience' projects.

The STHPI is an initiative of DAF, University of Queensland-QAAFI and the NSW Department of Primary Industries with key funding from Hort Innovation. The Cyclone Resilience project is funded by DAF and AgriFutures Australia. Both projects have shown great promise in significantly increasing the size and reliability of fruit yields. Added benefits include tree canopies suitable to potential mechanisation or robotics, greater production efficiency and greater cyclone resilience.

Since the beginning of the STHPI in 2013 researchers have gained a better understanding of factors such as vegetative vigour, planting density, tree architecture, canopy light relations and crop load that influence productivity of avocado, macadamia and mango when grown in high-density orchard systems. The first phase of this project will be complete in December this year.

The Cyclone Resilience project, running since 2013, came out of on-farm experience in cyclone Larry, where exotic tropical fruit trees grown on trellis withstood much of the devastating cyclonic winds. Trellising was a valuable insurance policy to saving crops from imminent destruction during cyclone events. The Cyclone Resilience project has been investigating the practicality, productivity and costs of production of trellising systems for tree crops such as lychee, rambutan, durian, mangosteen, jackfruit, macadamia, avocado and mango.

The main mango component of the STHPI is a field planting systems trial on DAF's Walkamin Research Station that has three mango varieties 'Keitt', 'Calypso' and 'NMBP 1243' growing at high (1250 trees per hectare), medium (416 trees per hectare) and low (208 trees per hectare) planting densities. In the high-density plots, trees are trained as either hedges or



espalier on trellis. In the medium density plots, trees are trained conventionally or as single leaders. In the low density plots trees are all trained conventionally.

The most recent production data from the 2017/2018 season saw a continued trend of outstanding results for the high-density planting system, four years after planting.

For all three cultivars, yields were significantly higher when grown at high-density compared to medium and low-densities, with the highest yield of 46.9 tonnes per hectare produced by espalier trained 'Keitt' grown on trellis. Low-density conventional trees produced the lowest yield across all varieties.

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Figure 1: Espalier trained and trellised 'Calypso' mangoes grown in high-density field trial on Walkamin Research Station in Queensland.



Figure 2: Single leader trained 'Keitt' mangoes grown in medium-density field trial on Walkamin Research Station in Queensland.



Figure 3: Conventionally trained 'NMBP1243' mango tree grown at medium-density field trial on Walkamin Research Station in Queensland.

Density	Training system	'NMBP 1243'	'Calypso'	'Keitt'
High	Espalier on trellis	17.6	34.8	46.9
	Conventional hedge	16.9	33.6	26.9
Medium	Single leader	11.9	12.7	18.4
	Conventional	8.6	14.6	17.3
Low	Conventional	4.7	7.6	9.1

Table 1: Orchard yields (tonnes/hectare) of three mango cultivars, four year old, planted at three densities, with three canopy training systems at the Walkamin Research Station, Queensland, Australia.

In the mango component of the Cyclone Resilience project, a trial site in Mareeba with trellised 'Honey Gold' mangos produced an encouraging yield of 43 tonnes per hectare at age 5 years.

Results and learnings from both these projects have encouraged further enthusiasm to evaluate intensive mango production systems as part of a new project funded by the Cooperative Research Centre for Developing Northern Australia (CRCNA). Two large mango growers; Manbulloo Ltd and BJM Enterprises, wish to grow their businesses through greater production of high-quality fruit, suitable for domestic and Asian export markets. These growers have now formed an industry-led venture with DAF in Queensland and the Australian Mango Industry Association (AMIA) to commercially trial new mango intensification techniques.

Using learnings from the STHPI and 'Cyclone Resilience' projects, high-density mango orchard technologies will be established as commercial-scale research trials in Queensland at Mareeba and Bowen and in the Northern Territory at Katherine. The trials will use 'Kensington Pride', 'R2E2' and two new 'NMBP' varieties to facilitate the transition to next-generation, high-productivity orchard systems. This research

joint venture will concurrently investigate industry transition issues from conventional to next generation systems and answer key orchard management questions arising from the change process.

This project will create impact for national industry growth through more productive, resilient and reliable mango orchards, able to service and grow export markets.



Figure 4: 'Honey Gold' mangoes on trellising on the Cyclone Resilience trial in Mareeba, Queensland. Trees are 5 years old with last season producing a yield of 43 tonnes per hectare

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Shedding some light on mango supply chains into Asia

Noel Ainsworth, Andrew Macnish and Yiru Chen, DAF

Australian mangoes are highly sought after in Asia, particularly as gifts for special occasions. Building this market requires consistent, premium product delivered to consumers. This can only be achieved by all partners along the supply chain working together to prevent loss of quality from poor handling practices.

The Serviced Supply Chains project is supporting export development by working closely with specific export chains across Australia to demonstrate the benefits of improving cold chain management. Over the past two seasons, a team from the Department of Agriculture and Fisheries (Queensland) monitored 20 export shipments of Manbulloo R2E2 mangoes to South Korea and China for shipment temperatures and fruit outturn quality of air and sea consignments.

Scott Ledger, Quality and Export Manager at Manbulloo said, "We're trying to deliver mangoes to our importers with enough life to hold and distribute the mangoes to retailers over a five to seven day period and give the retailers five days shelf life to sell the fruit to consumers. To keep our customers happy requires strict control of temperature through the supply chain, and temperature monitoring certainly helps us to keep an eye on what's happening".

Mangoes require careful temperature management to ensure adequate shelf life. If they're exposed to warmer than desirable temperatures, the fruit start to ripen. They generate heat as part of the ripening process, which can further increase fruit temperatures, particularly in the middle of the consignment. This often results in more advanced and uneven ripening within the consignment, reducing the shelf life and increasing costs down the chain.

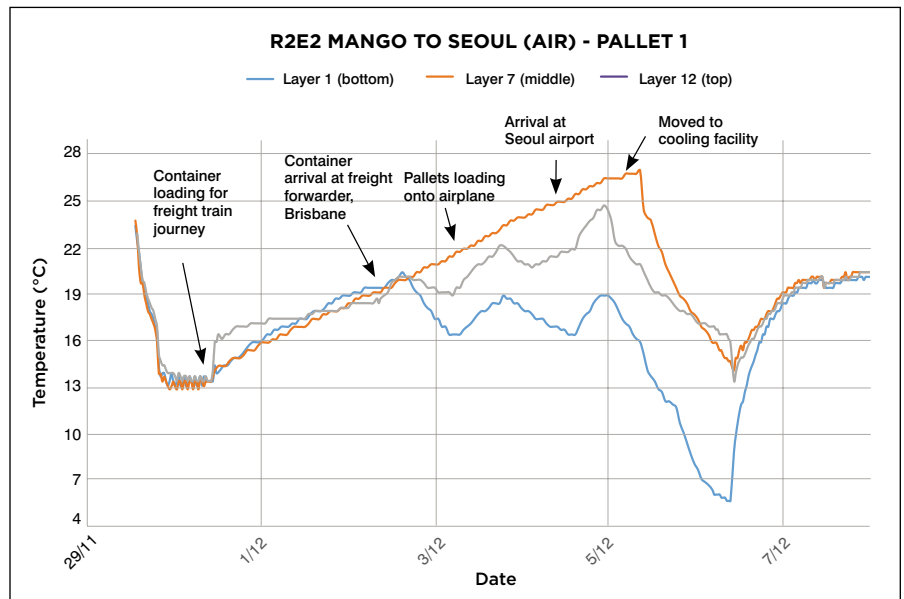


Figure 1: Air freight conditions resulting in fruit arriving at the importer with 60% yellow background skin colour. The temperature increase between farm and freight forwarder, as illustrated here, has not been consistently observed in the monitored air freight consignments

To manage ripening, both temperature and duration from harvest to consumption need to be monitored and controlled. Good temperature management is a lot more important with longer times between harvest and consumption, such as with sea freight consignments. Monitoring temperatures and duration through the supply chain identifies those steps where temperatures aren't managed well enough to maintain fruit quality and value.

The tracking of export consignments confirmed the importance of maintaining the recommended storage temperature of mangoes around 12-13 °C. Fruit held at these temperatures arrived with a desired level of ripeness and shelf life. Exposure to periods of handling at 20-24 °C in the air shipments unfortunately resulted in fruit arriving at an advanced ripening stage with limited shelf life.

Over the past two seasons, it has become clear that air and sea freight consignments are exposed to differing risks in relation to deviation from ideal temperatures and durations. Air freight consignments typically experience increasing temperatures during the air transportation while sea freight consignment temperatures are typically more stable. However, significant variations in temperature across the load often occurs in both export scenarios.

Figure 1 illustrates the increasing temperatures of an air freight consignment from farm to importer, and also the variation in temperature between layers in same pallet. The temperature in the centre of the pallet was higher than in the top or the bottom layer.

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Andrew Macnish (centre) recording outturn quality of Manbulloo mangoes with importers in South Korea.

“It’s been a great project to better understand and improve our supply chain to maintain the value of fruit destined for Asia”

- Scott Ledger, Quality and Export Manager at Manbulloo

Continued from page 20

Figure 2 illustrates the typically better temperature management during sea freight, but also the risks associated with trans-shipping through disruption of the cold chain and increased time for the sea freight journey.

“It’s been a great project to better understand and improve our supply chain to maintain the value of fruit destined for Asia” Scott said.

For more information contact: Noel Ainsworth, Principal Supply Chain Horticulturist, at DAF; noel.ainsworth@daf.qld.gov.au or (07) 3708 8563.

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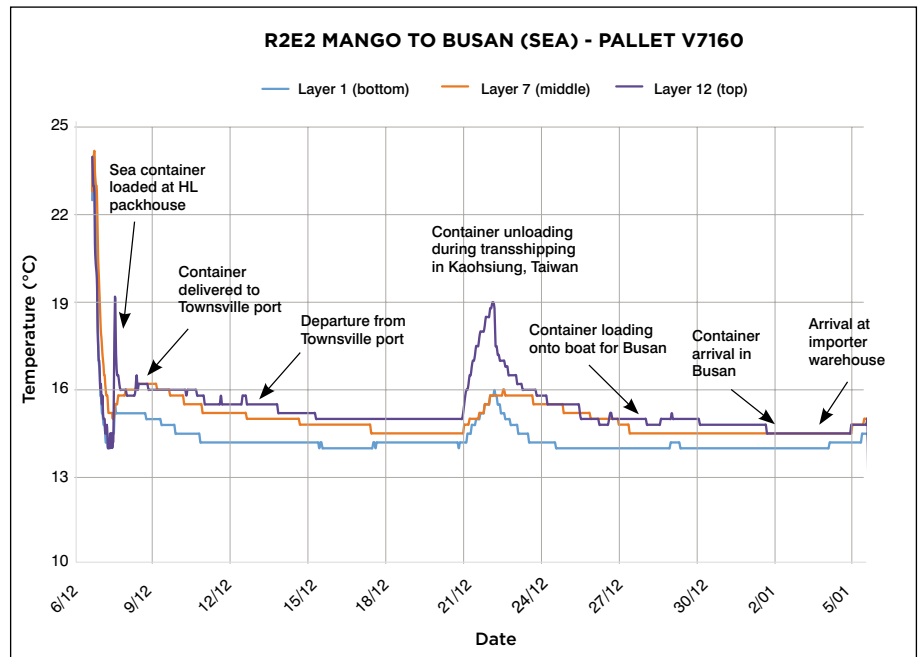


Figure 2: Sea freight temperatures and durations for a mango consignment to South Korea. The break in the cold chain during trans-shipping, and the extra days, resulted in fruit arriving at the importer with 50% yellow background colour.



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Last field season for the Magpie Geese on Mango Orchards Project

The last field season is about to kick off for the Charles Darwin University Magpie Goose Research Team. The researchers are studying Magpie Goose biology and ecology and investigating novel management techniques to inform future management programs.

PhD candidate Amélie Corriveau is studying Magpie Goose movements and food resources to address the ongoing issues with these birds on mango orchards in Northern Australia. "During the last two mango seasons, we captured over 250 Magpie Geese and GPS-tagged 89 of them. Some individuals are still sending GPS locations after more than 250 days tracking!" Amélie said.

While still crunching her movement data analyses, Amélie is preparing for the last field season of her research. "This year, I will collaborate with recreational hunters to collect Magpie Goose carcasses throughout the Greater Darwin Region, from which I will extract contents of different parts of their digestive system. DNA analyses will allow me to identify what food resources Magpie Geese consume during the mango season, and what is the importance of mangoes in their diet".

This season, the research team will also use wildlife cameras to compare Magpie Goose density on mango orchards with,

and without scaring. Field trials for novel management strategies such as use of drones and chemical repellents will also be undertaken during mango season.

The research team is working towards providing field-based knowledge that can lead to developing practical solutions on farms and broader scale management approaches for Northern Australia. Research outcomes will inform growers on when, where, and for how long management actions should occur, what other resources around mango orchards may be attracting Magpie Geese and what mitigation methods may be more effective than others.

This project is conducted in collaboration with the Northern Territory Government, the NT Farmers Association, and the Australian Mango Industry Association.

For more information on this research please email amelie.corriveau@cdu.edu.au

Article submitted by Charles Darwin University.



PhD student Amélie Corriveau collection Magpie Goose carcasses from recreational hunters during 2016 field season (Photo credit: Bart Irwin)



This project has been funded by Hort Innovation using the mango research and development levy and funds from the Australian Government. For more information on the fund and strategic levy investment visit horticulture.com.au



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