

Final Report

Australian Papaya Industry Communication Program

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Project code:

PP16001

Project:

Australian Papaya Industry Communication Program PP16001

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Summary

The Australian Papaya Industry Communication Program (PP16001) commenced in August 2017 and concluded in December 2020.

There are approximately 80-100 Australian papaya industry growers nationwide, with more than 85 per cent spread between Bundaberg in Queensland's Wide Bay region, and Lakeland in the Shire of Cook in Far North Queensland.

This communications program has been the first of its kind for the industry, with all outputs developed and implemented by Cox Inall Communications in collaboration with Hort Innovation, Papaya Australia and its executive, and the broader papaya industry.

The program has aimed to effectively communicate levy-funded R&D information using relevant channels to increase industry awareness of levy investment activities and stimulate adoption of R&D research by growers to promote a more profitable and productive industry.

With a production volume average of 15,000 tonnes per year, production value for Australia's papaya industry grew to \$27.5 million in 2018/19.

The program was supported by Papaya Australia who provided content advice, industry insights and access to Papaya Australia's database.

The primary target audience for the program was Australian papaya growers, levy payers, Papaya Australia Executive, Papaya SIAP, local grower associations, Hort Innovation and extended supply chain and industry stakeholders.

The program included a number of communications activities, which was developed and delivered by Cox Inall over the past three years. This included:

- Communications Strategy, which was reviewed annually.
- Six editions of the bi-annual publication of the Papaya Press, hard copy 8-page publication.
- Annual stakeholder survey.
- Ongoing maintenance of the *For Growers* page on the Papaya Australia website.
- Ongoing stakeholder engagement relating to the Hort Innovation Papaya Fund.

The regular outputs delivered under the communications program ensured papaya growers were informed of relevant and comprehensive information on R&D outcomes, the latest news and marketing updates for adoption within the papaya industry, seeking to support decision-making in businesses.

The implementation of the communications strategy guiding the roll out of PP16001 has successfully enabled levy payers to see clear linkages with the industry's strategic plan and evidence of return on their investment.

Keywords

Papaya, Papaya Australia, Papaya Industry, Cox Inall Communications, Research and Development, Marketing.

Introduction

The Australian Papaya Industry Communication Program (PP16001) commenced in August 2017 and concluded in December 2020.

This communications program has been the first of its kind for the industry, with all outputs developed and implemented by Cox Inall in collaboration with Hort Innovation, Papaya Australia and its executive, and the broader papaya industry.

The Papaya Industry Strategic Investment Plan (SIP) 2017-21 identified three desired outcomes for the papaya industry from levy investment over the five-year period. These were:

1. Increased quality to ensure consistency of supply to the consumer
2. Access to new varieties and improved pest and disease management to improve growers' productivity and profitability
3. Improved market access and increased consumer demand to increase returns to growers.

The Australian Papaya Industry Communication Program is closely tied to outcome 2, to ensure the timely delivery of R&D and marketing content to levy-payers and enhance on-farm productivity and research profitability.

The Papaya Industry Strategic Investment Plan (SIP) 2017-21 also identified 'Improved industry information and data sharing to advance production methods, supply chain forecasting, handling techniques and biosecurity defenses' as a key opportunity for Australia's papaya industry. Effective industry communications is central to achieving this.

Strategies to support this included:

- Support papaya business profitability by facilitating uptake of R&D
- Provide information and knowledge on industry updates and events, and articulate the return on investment from the papaya industry R&D and marketing levies
- Increase the reach of the papaya industry R&D and marketing program by engaging stakeholders in the papaya industry value chain
- Inform primary and secondary stakeholders about current issues relevant to the papaya industry
- Provide primary and secondary stakeholders and the broader community with information on the benefits that the industry levies (R&D and marketing) deliver.

In August 2017, Cox Inall was contracted by Hort Innovation to deliver communications services regarding R&D and marketing activities, to increase awareness and promote outcomes of papaya levy investment and build capacity within the industry.

In consultation with the peak body, Papaya Australia and Hort Innovation, Cox Inall developed a robust communications strategy that set out the approach and deliverables for the next three years. It aligned to support objectives outlined in the SIP with the aim of increasing linkages between Papaya Fund activities and levy payers.

Over the past three years, Cox Inall has developed six bi-annual Papaya Press publications, three annual stakeholder surveys as well as ensured ongoing maintenance of the *For Growers* page on the Papaya Australia website.

The bi-annual, 8-page, Papaya Press publication, has become a pivotal channel to connect growers with the latest R&D, marketing and Hort Innovation updates. Coming in both online and hard-copy formats, Cox Inall has developed content that drives awareness of and builds support for, papaya levy programs, ranging from biosecurity preparedness, pests and disease, minor use permits updates and best practice insights.

Over the past three years, Cox Inall has worked closely with Papaya Australia, Hort Innovation, the research community and growers to build an environment of familiarity around levy funded R&D projects and marketing initiatives, by delivering targeted communications outputs to high standard.

Methodology

The following methodology guided the delivery of the Australian Papaya Industry Communications Program.

Communications Strategy

The roll out of this communications program was guided by the initial development of a communications strategy, which was updated annually with collaboration from Papaya Australia and Hort Innovation.

The initial communications strategy was developed by Cox Inall, taking into consideration the priorities outlined in the SIP and feedback garnered by Cox Inall when attending the October 2017 SIAP meeting.

The initial development process included a review of previous communications outputs developed by the peak industry body, past and current R&D projects and reports, and taking into consideration the annual grower survey results.

Work in Progress Meetings

Cox Inall and the Chair of Papaya Australia held work in progress (WIP) meetings across the duration of the communications program.

The WIPs were considered a valuable forum to discuss projects, industry news and content for the next edition of the Papaya Press, ensuring articles were relevant, timely and to a high standard.

Annual Stakeholder Survey

The annual stakeholder survey performed throughout the Australian Papaya Industry Communications Program was used to inform the following year's strategy.

The annual survey consisted of 10 questions, developed by Cox Inall, and approved by Papaya Australia and Hort Innovation.

The questions were designed to garner feedback on the latest edition of the Papaya Press, the 'For Growers' R&D focused webpage, as well as determine understanding of the papaya levy, what information levy-payers seek, and preferred communications channels to access information.

R&D and Marketing Project Portfolio

Cox Inall built an excellent understanding of the levy funded R&D and marketing projects across the Hort Innovation papaya fund. This included regular telephone calls and emails to key project providers and researchers, to communicate the latest levy news, information and industry events and insights. This resulted in a good working relationship with not only the research providers, but also Hort Innovation.

Cox Inall were also in contact with the papaya marketing arm of Hort Innovation and Industry Strategic Partners, to ensure updates were well communicated in the Papaya Press.

Communications Outputs and Channels

The Papaya Press was the primary channel used to communicate with levy payers and industry stakeholders. This is further detailed in the outputs section of this report.

Outputs

During the course of the Australian Papaya Industry Communications Program, Cox Inall produced the following outputs.

Communications Strategy

Cox Inall Communications led the development of a communications strategy which guided the three-year communications program.

The communications strategy included a review of previous communications outputs developed by the peak industry body as well as past and current R&D projects/reports.

As the first of its kind for the industry, this strategy primarily focused on the development and establishment of new and existing channels to communicate and house outcomes of R&D investments to levy payers and other industry stakeholders. This outlined the development of the bi-annual hard copy 'Papaya Press' publication, the annual stakeholder survey, and the establishment of the *For Growers* page on the Papaya Australia website.

The strategy also outlined key messages, timeline of deliverables, stakeholder matrix, evaluation process and further engagement opportunities for communications moving forward, with the focus being the bi-annual Papaya Press publication (May and November).

In each communication strategy, Cox Inall also proposed additional outputs for consideration to widen the communications reach with levy payers.

The initial strategy was finalised in February 2018 and was updated on an annual basis.

Bi-annual Papaya Press publications

The Papaya Press was a new output for the industry in this communications program and included the design and production of a template for use in each edition.

The eight-page hard copy insert contains a mixture of shorter and longer articles relating to papaya levy investments and resources, as well as other related industry news, upcoming professional development opportunities and events.

Each publication was printed with hard copies distributed to the Papaya Australia database. Editions are also housed on the *For Growers* page of the Papaya Australia website.

Papaya Press publications:

- May 2018: <https://australianpapaya.com.au/website/wp-content/uploads/2018/05/PAPAYAPRESS-MAY.pdf>
- November 2018: <https://australianpapaya.com.au/website/wp-content/uploads/2018/10/Papaya-Press-November.pdf>
- May 2019: https://australianpapaya.com.au/website/wp-content/uploads/2019/05/CIC_106081_PAPAYAPRESS_MAY-2019_05-WEBREADY.pdf
- November 2019: https://australianpapaya.com.au/website/wp-content/uploads/2019/11/CIC_106337_PAPAYAPRESS_NOV-2019_WEBREADY.pdf
- May 2020: https://australianpapaya.com.au/website/wp-content/uploads/2020/05/CIC_106524_PAPAYAPRESS_MAY-2020-02-WEB.pdf
- November 2020: https://australianpapaya.com.au/website/wp-content/uploads/2020/12/CIC_106701_PAPAYAPRESS_NOV-2020_05-WEB.pdf

Annual Stakeholder Surveys

Three annual surveys were completed under PP16001.

The annual survey consisted of 10 questions, developed by Cox Inall, and approved by Papaya Australia and Hort Innovation.

The questions were designed to garner feedback on the latest edition of the Papaya Press, the 'For Growers' R&D focused webpage, as well as determine understanding of the papaya levy, what information levy-payers seek, and

preferred communications channels to access information.

The survey was developed on SurveyMonkey, which was shared with Hort Innovation and Papaya Australia with a blurb for sharing via EDM to their grower database. During the survey open period, Cox Inall also directly contacted papaya growers for response.

Website Maintenance

With the support of the marketing arm of Hort Innovation, Cox Inall has developed and maintained a levy-payer specific/grower focused webpage on the Papaya Australia website.

A content plan for this work was approved as part of the communications strategy submitted in MS102 and the webpage went live in early March 2018.

The landing page includes an overview of the papaya levy and how it is used, and includes links to the Papaya Press, Industry Resources and other key news items (for example: Join the Papaya SIAP). Cox Inall has kept this up to date across PP16001.

This is the final milestone report for the project. Since the last milestone of August 2020, Cox Inall has developed and distributed the sixth edition of Papaya Press (November 2020), and have ensured the *For Growers* section of the Papaya Australia website is up to date.

Outcomes

Cox Inall believes that it has achieved the key objective of PP16001, to increase industry awareness of papaya levy funded R&D and marketing. This is evident through the quality and quantity of articles provided in the bi-annual Papaya Press publications and through stakeholder survey responses.

Throughout the project, Cox Inall has developed a comprehensive portfolio of articles, sharing the latest information about the papaya levy fund, wider Hort Frontiers Initiatives where applicable, and profiling levy payers whilst highlighting the role of key stakeholders such as Hort Innovation and Papaya Australia.

The annual stakeholder survey was used to guide the strategy and inform future Papaya Press content. This yearly evaluation ensured communications were timely, relevant to levy payers and delivered to a high standard.

Cox Inall ensured levy funded project outcomes and updates were communicated and promoted so that industry stakeholders had an opportunity to read the latest findings and implement in the business operations.

Communications increased growers' knowledge of the R&D and marketing levies, to help them better understand where investment was being allocated through project updates.

Project management and stakeholder engagement was a critical part of PP16001. Cox Inall was in regular contact with researchers and project providers, to ensure growers had access to the latest news and resources regarding R&D and marketing.

Additional recommendations for outputs were provided in the communications strategy each year, as a way of further increasing engagement with growers and drive traffic to the Papaya Australia website.

Monitoring and evaluation

The success of the communications program is measured through engagement with the papaya industry, the outputs, and through the annual stakeholder survey.

The annual stakeholder survey provided the best opportunity to assess the sentiment of growers to the overall communications program, the value placed on outputs, understanding of the R&D and marketing levies, and whether the content has encouraged growers to seek more information or adopt R&D findings.

Across PP16001, engagement and participation with the annual stakeholder survey increased substantially from 4 in 2018 to 14 in 2020. This is a 250% increase in participation across the program and demonstrates a strong increased industry engagement with the Australian Papaya Industry Communications Program.

The final stakeholder survey delivered in June/July 2020, was designed to assess the sentiment of growers towards communications outputs and content, as well as what method of communication best engages them.

Results from this survey indicated that the Papaya Press is a valuable communication tool and resource for growers to access industry information and the latest R&D advice, with rating increasing across each survey under PP16001.

The majority of growers who completed the survey had also accessed the *For Growers* page on the Papaya Australia website since the May edition of the Papaya Press and indicated an increased understand of the papaya industry R&D and marketing levies.

Recommendations

This communications program has been the first of its kind for the industry, with all outputs developed and implemented by Cox Inall in collaboration with Hort Innovation, Papaya Australia and its executive, and the broader papaya industry.

The papaya industry communications program has enabled the communication of progress and outcomes of the levy funded R&D and marketing activities, to levy payers and wider industry stakeholders.

The engagement with the Papaya Press, the *For Growers* page and the annual stakeholder survey has been encouraging.

Cox Inall recommends that the Papaya Press should remain in the stable of outputs for industry, with this publication being consistently highly regarded across the stakeholder surveys.

It is also recommended that more regular industry communications are undertaken across the next program, in the form of eNewsletters. This will help ensure more timely updates of project findings as well as the ability to promote applications for initiatives or attendance at industry workshops or events for example. The regular communication will help growers more quickly address challenges and apply new R&D and marketing outcomes to businesses.

Stakeholder survey responses also indicate growers have a good understanding of the R&D and marketing levy, and that they value levy funded R&D focused outputs such as R&D project outcomes and fact sheets.

From this insight, Cox Inall recommends the development of Factsheets through the papaya communications program. This will offer a practical resource for growers to access online at any time.

Ensuring there is a practical element to the content being released under the communications project will also further the ability of growers to adopt R&D outcomes for the benefit of their own businesses, fostering economic and environmental sustainability for the industry.

Climate and pest and diseases were identified as key issues for growers in the last year of the communications program and this focus should continue in future communications activities.

Refereed scientific publications

None to report.

Intellectual property, commercialisation and confidentiality

No IP, commercialisation or confidentiality issues or development to report.

Acknowledgements

Cox Inall would like to acknowledge Papaya Australia for their ongoing support and collaboration on PP16001. The two organisations have developed a strong working relationship throughout the delivery of the project.

Cox Inall would like to acknowledge Hort Innovation as a key enabler of R&D and marketing for Australia's horticultural sector. Cox Inall found it very beneficial to work closely with project providers, to equip levy payers with the latest R&D and marketing outcomes.

Importantly, Cox Inall would like to thank papaya levy payers and SIAP members who have contributed to the success of the program.

Appendices

Appendix 1: Papaya Press publications (six editions)

PAPAYA PRESS

ISSUE 1 - MAY 2018



Papaya Sticky Disease. Credit: QDAF

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New test to offer early detection of Papaya Sticky Disease

The Queensland Department of Agriculture and Fisheries (DAF) has successfully developed a single, sensitive test that is able to detect all of the four known umbravirus-like viruses that cause Papaya Sticky Disease.

DAF Plant Pathologist Dr Paul Campbell said the test can be applied to a variety of materials.

"The test has proved successful in working on leaf, fruit, petiole, seed, pollen and tissue culture material," he said.

"This is an important option for industry to have now, as this viral test allows for early detection well before fruit symptoms appear."

Australian fruit displaying similar symptoms tested negative in 2014 for papaya meleira virus (PMeV), the virus responsible for the disease. In 2016, more fruit from a number of Australian orchards displaying disease symptoms were submitted for diagnosis.

Although virus particles were observed in the plants, the plants were again

negative for PMeV. Next generation sequencing was used to look for virus sequences, and a new umbravirus-like virus was found in the infected plants.

Internationally during this time, the causal agent of Papaya Sticky Disease was changing. Following the 2015 sequencing of a virus causing the disease in Mexico, which showed no relationship with the virus in Brazil, there was a re-examination of the Brazilian strain of PMeV. It was shown in 2016 that two viruses were in the Sticky Disease plants, the original virus and an umbravirus-like virus.

Dr Paul Campbell said the disease was first identified in Brazil more than 30 years ago with fruit weeping watery latex that causes further cankers, making the fruit unmarketable.

"Altogether there are now four umbravirus-like viruses sequenced from papaya plants around the world, being Australia, Brazil, Ecuador and Mexico," he said.

"Although they are related, there is a large amount of variation between

them, and are probably different species of a new genus of viruses.

"These viruses are strange, in that they do not produce a coat protein and require the help of other viruses to form particles.

"We currently don't know what this companion virus is for any strain apart from the one found in Brazil. Details about this other virus are important as they have large impacts on virus stability, insect movement, and symptom development."

DAF Mareeba has the ability to carry out the test in small numbers – phone 13 25 23 or email web@daf.qld.gov.au

For commercial volume testing contact GrowHelp via GrowHelp@daf.qld.gov.au

REMEMBER!

Papaya Sticky Disease is mechanically spread, so disinfestation of tools with bleach is recommended to avoid spreading between plants.



Papaya Press Volume 1 was produced for Papaya Australia by Cox Inall Communications.

This magazine is funded by Hort Innovation using the papaya R&D levy and contributions from the Australian Government.

Hort Innovation is the grower-owned, not-for-profit research and development corporation for Australian horticulture.

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**Hort
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Strategic levy investment

**PAPAYA
FUND**



See your levy at work with the latest HORTLINK!

Get an update on all new, current and recently completed levy-funded activity with the new edition of Hort Innovation's Hortlink. Just released, you can check out the papaya section at www.horticulture.com.au/hortlink-2018-edition-1/papaya.

As well as easy-to-read project updates, results and resources you can use in your business, Hortlink includes case studies, industry contacts and more. Don't miss the Faces of Horticulture section, which includes a closer look at Hort Frontiers activity, scholarship opportunities and other handy info!

Stay in the loop with your levy by becoming a member of Hort Innovation, the grower-owned, not-for-profit research and development corporation for Australian horticulture. Paying a levy doesn't automatically make you a member, but signing up is free at www.horticulture.com.au/membership.

From the Chair

GERARD KATH

Welcome all papaya interested readers to a new papaya communications publication.

I am aware that the last Papaya Post was produced in June 2015, nearly three years ago. I'm also aware that many growers have been asking as to why it is not being still done. The previous publication was a project managed under Papaya Australia, which was terminated in June 2015, so it has taken some time to get it going again.

The new *Australian Papaya Industry Communication Program* (PP16001) is funded through the Hort Innovation Papaya Fund. Cox Inall Communications were appointed by Hort Innovation at the end of last year to implement the three-year program, which includes this new biannual magazine – the Papaya Press – and also an industry-facing section of the www.australianpapaya.com.au website.

Cox Inall consultant Megan Woodward has been the main driver behind this publication and she has been working hard to give us a new and fresh version of the old 'Papaya Post'.

At the time of writing this report I have not had much insight as to how it will look or be received, so I hope you will enjoy the content and presentation. We are aware that most publications nowadays are in email form, however within the SIAP meeting we felt that a hard copy is still the best.

I would encourage you to please pass on any feedback to the communications lead at megan.woodward@coxinall.com.au about the new look magazine so we can let the communications team know – what was good, what was bad and what you might like to see in future editions.

So, where is the industry at now, and where are we likely heading?

The last five years have seen significant growth in terms of production, yet a slight decrease in grower numbers. Production growth has been relatively equal on the coast and the Tablelands with not much change in Northern Territory or WA. The expansion has been



mainly from existing growers who seem to be getting larger. However, I would suggest that over the last three to six months we have seen an increase in grower numbers being mainly from the banana industry, which has been through some difficult times.

This means that over the next one to two years we will most likely see an increase in fruit landing at markets, which will have to be met with a robust marketing strategy or growth by force as a result of poor prices.

We are a much more mature industry and a more consumer accepted product nowadays, to where we were five to 10 years ago. This is a result of better and more stable growing, as well as marketing practices, along with an increase and unification of varieties. Consumers seem to know our fruit far better these days and are less confused with different varieties and eating experiences. We must however, recognise that a lot must still occur in consumer education to be able to expand demand and meet likely increased production. Industry growth and viability will be on the back of increased demand and growers producing a product that meets or exceeds that demand, at a viable price. Time will tell.

On this note, I wish all growers a successful time ahead. I hope that the remaining year is favourable weather wise and that fruit quality is excellent with prices at profitable levels.

Happy papaya production.

Regards,
Gerard Kath

Hort Innovation Update with Papaya Industry Relationship Manager Brad Mills



BRAD MILLS

The new Papaya Strategic Investment Plan is here

A five year plan has been developed, representing the Australian papaya industry's collective view of its research and development (R&D) and marketing needs.

The *Papaya Strategic Investment Plan 2017-2021* (SIP) is an investment roadmap for the Hort Innovation Papaya Fund. It outlines the priority areas for R&D investment, helping to guide decisions on projects to be funded by the papaya levy.

The 29-page document has been developed by Hort Innovation in consultation with growers, Papaya Australia, and the broader industry.

Download the Plan from the 'For Growers' page on the Papaya Australia industry website <https://australianpapaya.com.au/for-growers/industry-resources>

How is the SIP used?

The plan is structured around three key investment outcomes, each backed by a number of strategies to address the priorities of the industry.

- Increased quality to ensure consistency of supply to the consumer
- Access to new varieties and improved pest and disease management improves growers' productivity and profitability
- Improved market access and increased consumer demand increases returns to growers.

All research projects submitted to Hort Innovation will be weighed up through an advisory process (see below) to ensure they reflect the agreed strategic objectives for the industry, as outlined in the SIP.

Industry Advice

The Papaya Strategic Investment Advisory Panel (SIAP) has responsibility for providing strategic investment advice to Hort Innovation. Both Hort Innovation and the advisory panel will be guided by the SIP, focusing on those issues identified as being a higher priority.



The Papaya SIAP currently consists of grower representatives from both the Innisfail and Mareeba growing regions as well as representation from Queensland Department of Agriculture and Fisheries. The SIAP is chaired by Eoin Wallis, an independent consultant responsible for ensuring the panel operates with good governance.

Summaries of each meeting can be found on Hort Innovation's Papaya Fund page at www.horticulture.com.au/papaya

Potential impact of the SIP

The anticipated investment of \$2.4 million over the next five years in R&D, extension and marketing activities is expected to generate \$10.03 million in net benefits for the industry, representing a benefit cost ratio of 4.18 times to growers and service providers along the value chain.

Have an idea you'd like considered as a research project?

Hort Innovation encourages all growers and industry participants to share their thoughts and ideas for the research and other investments they would like to see.

If you've got an idea, head to the Hort Innovation website (www.horticulture.com.au) and search for 'Concept Proposal Form'. Ideas that are in line with strategic investment priorities are directed to the relevant advisory panels for advice. That advice is then used by Hort Innovation to work the ideas into project proposals.



R&D UPDATE

New varieties on their way!

Queensland researchers aim to release new papaya varieties to growers next year as part of an ongoing research project.

Led by researchers at Griffith University, *New genetic targets to improve quality in Papaya* (PP15000) is a strategic levy investment under the Hort Innovation Papaya Fund. It was funded by Hort Innovation using the papaya research and development levy and contributions from the Australian Government.

Researcher and Industry Development Officer, Dr Chat Kanchana-udomkan, said the ultimate goal of the breeding program component of the project is to produce tailor-made varieties suitable to the growing regions of the Tablelands and coastal areas.

"We have high goals for this project as the new varieties need to perform better than the industry standard cultivars, which are RB1 for red papaya and 1B for yellow pawpaw," Dr Kanchana-udomkan said.

"We are aiming for improvements in yield, eating quality and, most importantly, flavour."

The research team evaluated 26 breeding lines for fruit quality and productivity characteristics in three consecutive years, aiming to identify potential new parental varieties.

"Good performing trees were then selected and pollinated to produce new F1 hybrids," Dr Kanchana-udomkan said.

"The F1 hybrids have been planted and evaluated for their performance in multiple environments, and the best three performing trees in each growing region were selected on productivity and fruit quality characteristics, including high yield, thick flesh, good skin characteristics and flavour.

"These were self-pollinated (F2) to fix the good characteristics."

Dr Kanchana-udomkan said in theory, the process needs to repeat at least five cycles (F5).

"We are currently having F3 generations (87% genetic stable) of red and yellow papayas planted in five different plantations," she said.

"The selected lines reveal low fruit set, high yield and good flavour. Seeds of F4 (94% genetic stable) are

under the production process and will be available to growers in the next planting season.

"The next phase of the breeding project is to stabilise the parental lines and produce more uniform seeds for growers."

The overarching project began in 2016 with a focus on improving the quality of Australian papaya and producing elite, uniform cultivars. It has five key sub-projects:

- Breeding to improve flavour and other important traits in commercial papaya
- Collection of papaya germplasm and the development of a related database, to provide a resource to increase the genetic base of Australian papaya
- Molecular studies to assist breeding for papaya
- Papaya ringspot virus type P (PRSV-P) resistance work
- The employment of an industry development officer (IDO), who is



Dr Chat Kanchana-udomkan in the field.

responsible for carrying out the other sub-project work and for working closely with growers, researchers and other industry stakeholders.

For an update on other ongoing work in the project, access the latest edition of Hortlink via the Papaya Australia website 'For Growers' page: <https://australianpapaya.com.au/for-growers/industry-resources>

DID YOU KNOW:

One major output from this project to date is the development of the Handbook of Papaya Evaluation: Productivity and Fruit Quality Traits. You can download it from the 'For Growers' page on the Papaya Australia website!

Any questions about this project? Contact researcher and industry IDO Chat Kanchana-udomkan at c.kanchana-udomkan@griffith.edu.au

Hort Innovation
Strategic levy investment

PAPAYA FUND

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

REGIONAL ROUND-UP

INNISFAIL, QLD - Joe Zappala

Production on the wet tropics has been high. Good plantings last year as well as good growing conditions in the second half of last year have resulted in good autumn production.

Flooding events in February and two further flooding events in March have rainfall totals equaling above 1 metre. This has affected quality with ripe fruit rots and Phytophthora being an issue. The wet weather has also affected tree survival especially in older trees.

The wet season monsoon has now moved back to the Northern Hemisphere and the weather has improved significantly. A lot of new growers are expected to come on line towards the end of the year, and increased plantings on the coast are expected to deliver good production in the last four months of the year.

TULLY, QLD - Daniel Mackay

The Tully papaya growing region has just endured its first heavy wet season in many years. This hindered picking, slowed down growth and postponed early planting of papaya.

Despite these setbacks, Tully growers have implemented better growing practices which should contribute to producing good volumes of fruit through the rest of autumn.

Surprisingly, the recent challenging conditions have not impacted visual appearance and eating quality of the fruit, as may have been expected. Looking forward, winter will slow down growth as normal, but spring will see good volumes again.

TABLELANDS, QLD - Gerard Kath

This regional wrap covers the areas of Atherton Tablelands from Atherton to Mareeba and west to Dimbulah and north to Lakeland.

This region is continually expanding in papaya production by both big, small and new growers. In the main, there are not that many growers (10 to 20) but some growers are very large. Small growers are typically three to five acres and large growers being 100 to 150 acres. My guess is that the region accounts for somewhere around 50% of industry production for 2017 and 2018. Most plantings have been in the red varieties with about two to three growers growing yellows.

Like all regions, weather during the wet season plays a big part in how the next eight month crop ends up. The Tablelands enjoyed a close to normal wet season with some areas exceeding average. The most important effect here is that Tinaroo Dam is now sitting at approximately 95%, which secures water for irrigation for the remainder of the year.

There have been some fruit quality problems in the last two to three months due to the wet, however I would expect quality to improve from now on. It remains to be seen how cold winter will be as this can also have an effect on quantity and quality.

I see an increase in production on the Tablelands this year compared to last year due to increased plantings and no major growing impediments thus far. There still seems to be optimism for the future.

CARNARVON, WA - Annie van Blommestein

Pawpaw production in Carnarvon has been steady so far this season and tree health has improved with the good supply of fresh water that has come down the Gascoyne River. These flows have freshened up the aquifers, so water supply for the year should be very reliable.

The predominant species of pawpaw grown in Carnarvon is Red Lady and trees are kept for an average of three years, with the majority of fruit picked as greens. This may change in the near future with a current Mediterranean Fruit Fly eradication project in full swing. The Carnarvon Growers Association Recognised Biosecurity Group (CGA RBG) baiting team and sterile fly release program coordinated by the Department of Primary Industries and Regional Development (DPIRD) together with good industry involvement has led to significant reduction in monitored numbers of wild flies, which is good news for all the growers in the district.

Want to submit an update from your growing region?
Email industry relationship manager Brad Mills to be included!
bradley.mills@horticulture.com.au

Minor use permits for the papaya industry

**JODIE PEDRANA, R&D MANAGER,
HORT INNOVATION**

While the use of pesticides and other chemicals in the horticulture industry is being modified through the increasing uptake of integrated pest management approaches, there remains a need for the strategic use of specific chemicals.

Chemical companies submit use patterns for product label registrations to the Australian Pesticides and Veterinary Medicines Authority (APVMA) – however the papaya industry is generally provided with limited label registrations because of its ‘minor’

crop status in this area (meaning the chemical companies can consider the market size too small to generate adequate commercial returns for the R&D investment they’d need to make to support a registration). This is where minor use permits come into play. The APVMA’s national permit system adds some flexibility to the approval process and provides a legal framework that can allow access to products for minor-use purposes.

Through the *Papaya industry minor use program* (PP16000) in the Hort Innovation Papaya Fund, levy funds and Australian Government contributions are used to submit renewals and applications for these minor use

permits to the APVMA, as required.

All current permits for the industry are in the table below. Those flagged with an asterisk (*) are permits that have been applied for or renewed through PP16000 in the current financial year.

Before use, it is recommended that you confirm the details of the permits through the APVMA website at <https://portal.apvma.gov.au/permits>.

Upcoming minor use permits

When available, details on any newly issued or renewed permits are circulated in Hort Innovation’s monthly Growing Innovation e-newsletter, which levy-paying members receive monthly.

MINOR USE PERMITS CURRENT AS OF APRIL 18, 2018

Permit ID	Description (Chemical / Crop / Issue)	Date issued	Expiry date	Permit holder
PER12592	Chlorothalonil and difenoconazole / Papaya / Black spot and brown spot	14-Aug-11	30-Jun-20	Growcom
PER13076 Version 2	Propamocarb / Papaw or papaya (seedlings) / Damping off	05-Apr-12	31-Mar-22	Papaya Australia C/Hort Innovation
PER13158 Version 9	Dimethoate / Specified citrus and tropical fruit commodities wit inedible peel (post-harvest) / Various fruit fly species	06-Oct-11	06-Mar-19	Hort Innovation
PER13671 Version 3	Beta-cyfluthrin (Bulldock 25 EC) / Papaya / Fruit-spotting bug and banana-spotting bug	28-Nov-12	28-Feb-23	Papaya Australia C/Hort Innovation
PER14098 Version 2*	Etoxazole (Paramite Selective Miticide) / Papaya / Two-spotted mite	3-Oct-13	30-Jun-23	Papaya Australia C/Hort Innovation
PER14097 Version 3*	Abamectin and fenbutatin oxide / Papaya / Two-spotted mite	31-Oct-13	30-Jun-23	Papaya Australia C/Hort Innovation
PER12450 Version 6	Trichlorfon / Specified fruit crops / Fruit fly	06-Oct-11	31-Jan-21	Growcom
PER14417	Copper as hydroxide / Papaya / Papaya fruit rot	28-Feb-14	31-Mar-19	Papaya Australia C/Hort Innovation
PER14490 Version 2	Metalaxyl-M (Ridomil Gold), Metalaxyl (Zee-mil) + Phosphorous acid / Papaya / Phytophthora root rot and pythium	4-Apr-14	31-Mar-22	Papaya Australia C/Hort Innovation
PER13859	Dimethoate / Orchard clean-up for fruit fly host crops following harvest / Fruit fly	9-Feb-15	31-Jul-24	Growcom
PER80746	Ethephon / Papaya / Fruit de-greening	18-Aug-15	31-Aug-20	Papaya Australia C/Hort Innovation
PER85397*	Sulfoxaflor (Transform) / Lychee, mango, papaya, and passionfruit (field grown) / Fruit-spotting bug and banana-spotting bug	17-Apr-18	30-Apr-23	Hort Innovation



Not a member? Sign up to the free membership program via <http://horticulture.com.au/membership-application-form>.

Any new or renewed permits will also be searchable, along with all other current permits for the industry, at <https://portal.apvma.gov.au/permits>.

Data generation projects in papaya

Hort Innovation funding is used to generate data for the support of permit applications to the APVMA. Data generation projects have and continue to involve a number of minor use permits and label extensions across the various horticulture industries, including papaya.

To facilitate these projects, Hort Innovation has supported the horticulture sector in gaining access to additional funding for strategic investment. In 2015/16 this included almost \$1.1 million in assistance grants for access to industry priority uses of AgVet chemicals, from a possible \$1.6 million available. In 2016/17, close to \$1.3 million was secured in these grants, from a possible \$2.4 million pool available to all agricultural and livestock research and development corporations.

For the papaya industry, funding assistance from the 2016/17 grant program is being used to generate data sufficient to support an application for label approval for Trivort insecticide (acetamiprid + pyriproxyfen) with ADAMA, for the control of a number of pests in tropical crops including spotting bugs, hoppers, scales and mealybug. The studies are being undertaken through the project *Generation of residue, efficacy and crop safety data for pesticide applications in horticulture crops* (ST16006) and are due for completion in early 2020.

Funding from the earlier round of assistance grants was used to generate sufficient data to support the permit extension application for PER13671, supporting the continued use of beta-cyfluthrin (Bulldock 25 EC) in papaya for the control of fruit-spotting bug and banana-spotting bug. These studies were undertaken through the project *Generation of residue data for pesticide minor use applications in horticulture crops* (ST15027) and were completed in July 2017. Permit PER13671 was extended in February 2018 as version 3, until 2023.

Tackling post-harvest decay losses with fungicides and hot water

Growers may recall previous research published by Lynton Vawdrey and Yan Diczbalis from the Queensland Department of Agriculture and Fisheries (QDAF) into reducing losses through post-harvest decay of fruit.

The project *Effect of curative and protective pre-harvest fungicide and post-harvest hot water applications on decay of papaya* (PP1300) was a strategic levy investment under the Hort Innovation Papaya Fund. It was funded by Hort Innovation using the papaya research and development levy and contributions from the Australian Government.

Specific recommendations have resulted from the 2014-2015 trials at Innisfail and Mareeba on the most cost effective spray combinations for the control of post-harvest rots.

KEY RECOMMENDATIONS:

The fungicide spray schedule of chlorothalonil and mancozeb (Mareeba area) or an alternating program of chlorothalonil and copper hydroxide (Innisfail area) will provide the most cost effective control of post-harvest rots of papaya. The direct impact of de-leafing in reducing post-harvest rots is small, but the practice also provides the added benefit of optimising spray coverage in the control of leaf diseases.

Hot water treatments had a greater impact in reducing disease than that of Sportak®, the currently registered postharvest fungicide.

The findings from this study provide justification for the industry to consider hot water as an effective alternative to prochloraz.

Hort Innovation
Strategic levy investment

PAPAYA FUND

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

Papaya Marketing Update



ELISA KING

Continuing on from a successful 2017, marketing efforts for 2018 are already showing strong results! Here's the latest on key activities from Hort Innovation's Marketing Lead for Papaya, Elisa King.

PR Health Report + Media Engagement

One of the cornerstone aspects of marketing activities undertaken this year is a health report commissioned by Hort Innovation, produced by Accredited Practising Dietitian Caitlin Reid.

The nutritional review recommends that papaya should be a regular addition to the shopping basket, and highlights the significant health benefits associated with the fruit.

In addition to the health report, 12 new recipes have been developed for the Australian Papaya website (<https://australianpapaya.com.au/recipes/>). Each of the recipes has been shared with media in collaboration with the health report in an effort to extend the reach of the papaya marketing campaign.

Women's Fitness magazine featured a double page spread on papaya in their May 2018 issue which included one of the new recipes as well as health insights from Caitlin Reid.

To further engage media, the recipes and health report were included in a special papaya produce hamper sent to

specific social media influencers, which resulted in the sharing of content by popular Instagram identities.

In-store Sampling

The papaya in-store sampling campaign started on the 28th of April and runs until 26th of May 2018. 60 stores – including Woolworths, Coles and Independent retailers – will take part in the campaign across New South Wales, Queensland, South Australia, Victoria and Western Australia.

Brand ambassadors man the sample sites and offer consumers freshly cut papaya samples with an optional squeeze of lime. The in-store campaign also offers a brilliant opportunity for key messages from the health report to be communicated with shoppers.

Baby Show & Expo Update

The Essential Baby and Toddler Show is a mass consumer event, staged annually in Brisbane, Melbourne and Sydney. More than 45,000 new and expectant parents will attend the shows in 2018, all looking to discover the latest products, services and advice in the market.

Papaya is considered a pregnancy and baby superfood, and the expo offers an ideal target audience for papaya.

The first of the expos was held in Melbourne in late April.

Brand ambassadors offered samples of red papaya puree with a hint of

fresh banana, as well as freshly cut papaya with a squeeze of lime. A recipe brochure was also handed out.

The Sydney event will be held 18th – 20th May; Brisbane event will be held 15th – 17th June.

Social Media Insights

The top post on the Papaya Australia Facebook page (@papayaaustralia) for April was an educational message about the different varieties of papaya and papaw. This was a great opportunity to highlight variety differences and also link to the industry website.

We've found that those who follow the page – now equaling more than 25,300 people! – respond well to educational messages, and are keen to learn more about the fruit. We'll continue to create content like this, alongside beautiful recipes.

We've also noticed that the busiest time on the Facebook page is between 6pm and 10pm, so more content will be scheduled during this time.

To read the full Marketing Update, visit <https://australianpapaya.com.au/for-growers/>

Hort Innovation
Strategic levy investment

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PAPAYA PRESS

ISSUE 2 - NOVEMBER 2018

Exporting growth through levy funded 'Papaya Industry Export Market Development Strategy 2023'

Dr. David McKinna

Global production of papaya in 2016 was 12 million tonnes, indicating a consistent growth of 40% across the last decade. However, in this global context Australia is only a small player, which is why the Papaya Industry Export Market Development Strategy 2023 has been developed; to strategically review and identify potential opportunities for Australia entering the export market.

In March this year, our team in conjunction with MCKINNA et al, performed market analytics as part of the *Tropical Fruit Industries Export Strategy* (MT17002) across a range of commodities. Using the Market Potential Index (MPI) we were able to identify a potential export market of approximately 310 tonnes could be achievable for the papaya industry by 2023. Our Australian Tropical Fruit Export Strategy identified local weather conditions as a definite advantage, but also that Australia's underdeveloped export supply chain, high labour costs, and issues surrounding the nature of the fruit, were key barriers inhibiting market expansion on a global scale. Findings from these market analytics were used to underpin and inform Hort Innovation's investment in export.

The Papaya Strategic Investment Plan (SIP) identified the driving and

development of growth strategies for Australia's domestic market long-term, and export development, as a priority; aiming to improve market access and consumer demand. The Papaya Industry Export Market Development Strategy 2023, was developed using levy funding from the papaya industry and Australian government. The aim is to improve export market supply chains, increase product development, and to strategically engage and access new markets for industry growth and expansion. The implications would be significant for the industry, particularly for growers.

Ideally, this strategy will provide a valuable resource for both growers and industry, to capitalise on investment opportunities. Although Australia's tropical fruit industries are in the early stages of its export journey, the potential opportunities for growth and development is encouraging. Australia's stable weather conditions for example, means export is possible across multiple seasons if a global competitor is experiencing crop failure; common considering papaya is heavily grown in countries subject to severe weather events. We are lucky to have extensive choice in papaya varieties, and great potential lies with growing interest for red papaya.

To achieve the goal of 310 exported tonnes by 2023, our next steps must

be focused on addressing these key barriers and challenges. We need to work at developing the supply chain and support within the industry, and build a system where this highly perishable produce can be shipped overseas, or look at investing more money into research and development to improve its appearance.

Following the findings from this strategy, Hort Innovation aims to work with the papaya industry to gauge interest in more levy investment being directed towards trade research and development.

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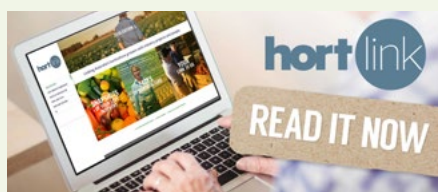
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Hort Innovation is the grower-owned, not-for-profit research and development corporation for Australian horticulture.

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**Hort
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Strategic levy investment

**PAPAYA
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See your levy at work with the latest HORTLINK!

Get an update on all new, current and recently completed levy-funded activity with each edition of Hort Innovation's Hortlink. You can always find the latest edition on the Hort Innovation Papaya Fund page at www.horticulture.com.au/papaya.

As well as easy-to-read project updates, results and resources you can use in your business, Hortlink includes case studies, industry contacts and more. Don't miss the Faces of Horticulture section, which includes a closer look at Hort Frontiers activity, scholarship opportunities and other handy info!

Stay in the loop with your levy by becoming a member of Hort Innovation, the grower-owned, not-for-profit research and development corporation for Australian horticulture. Paying a levy doesn't automatically make you a member, but signing up is free at www.horticulture.com.au/membership.

From the Chair

GERARD KATH

Welcome all Papaya Press readers to the second edition of this communication post.

We are now past mid-September and temperature, fruit volumes and sales all seem to be hotting up. Our industry often enjoys a marketing window in spring prior to the big influx of short season summer fruits. It is an opportune time for our product to shine and grow sales to new and existing customers.

I appreciate that in last three months fruit volumes have been slightly below expectations, however my feeling is that for the next few months prior to Christmas there will be large volumes of fruit coming. The challenge is for every grower to harvest, market and profit from this challenging period.

I still see a positive future for our industry and this seems to be shared by a range of growers to invest in greater plantings. I believe this to be occurring in a range of regions from Lakeland to the tablelands to the coast. The major expansion is obviously in the red papaya lines, with RB1 being the predominant line.

Hort Innovation Changes:

I just went back to read a report I wrote in June 2015. I commented on the changes occurring from HAL to Hort Innovation and the possible effect this may have on our industry. I noted that change is the one constant. Well, change is still very much occurring at Hort Innovation.

Brad Mills has been replaced by Christian Patterson as the relationship manager and Elisa King is back again as marketing manager. I have mixed thoughts on these changes as Elisa King has been one of our best marketing managers and Brad Mills was very good as industry services, yet it is very difficult for managers to contribute greatly if they are continually being moved around.

We welcome Christian Patterson's appointment and will surely have



many robust discussions regarding research and development programs. I can report that of late we have had some deep discussions around the 'clean seed project' (Papaya sticky disease) and mainly about the breeding project. Open and frank discussions are always best and hopefully positive results will be achieved. We are all on the same page in wanting the best possible outcome for the levy money collected, particularly in relation to the two projects mentioned above. Time will tell as to the value of dollars invested.

On that note, change and time will always be occurring and results should be for the benefit of all levy payers.

Best regards.

Gerard Kath



Christian Patterson

Consumer research indicates awareness and trial is key to industry expansion

ELISA KING, MARKETING LEAD,
HORT INNOVATION

Earlier this year, Hort Innovation made a levy investment into papaya consumer research, with the aim of using the findings and insights to help further grow and develop the papaya market. The research has been used to inform and shape the industry's Strategic Marketing Plan for the next 3 years.

The research suggests that 95% of consumers are open to trialling papaw or papaya which is an encouraging result. Specifically, on papaya, less than 20% of consumers have purchased papaya in the last 12 months however this specific group account for almost 80% of papaya purchases.

This type of insight suggests that awareness driving activities and sampling programs are critical to helping improve the market penetration of papayas domestically. From the insight noted above, once consumers have trialled papaya, experienced its flavour and understand their health benefits, they become loyal and purchase more frequently.

Furthermore, regular consumers of papaya possess extremely positive perceptions and attitudes towards the fruit. Among frequent consumers, 89% love the taste, 88% like texture, 91% believe it's great for health, and 91% consider it easy to prepare and can be eaten any time of the day. The opportunity lies in ensuring current non-purchasers are aware and experience these positive attributes to drive them to become regular papaya consumers.

For a detailed copy of this report, 'Consumer research driving growth for Papaya', please contact Marketing Lead, Elisa King at elisa.king@horticulture.com.au.

A key lever in generating awareness of papayas among target consumers is through social media. Historically, we have seen strong engagement on social posts relating to grower content. We encourage our growers to submit content that can be featured on the papaya social media platforms. This provides a great opportunity to connect consumers with our growers.

Send through images or videos, with your social media handle so we can tag you. Capture something unusual, interesting or simply beautiful, that shows off your produce.

Check out these top tips to get the most out of your social media post!

- Use lots of natural light – and keep the sun behind you
- Take pictures and shoot video in landscape mode
- Try to capture at least one person in the shot
- Move close to what you are capturing
- Remove anything that is distracting from the main image
- Take a variety of shots

NOTE: When sending through images and/or videos, please include the name of your Facebook and/or Instagram page so you can be tagged. If you do not have one, just include your name and the name of your farm so it can be included in the post. Also ensure that all people featured in the pictures are happy for their photos to be used for the above purposes.

Let's spread the word and get papaya in every Australian trolley – know it, taste it, love it!

PP17001 “Papaya Consumer Research”

'PP17001 Papaya Consumer Research' project was developed to better understand the current Australian papaya consumer landscape.

Based on the study, most papaya purchasers belong to young families (34%), or are young professional (35%) households. The most popular age group of papaya purchasers are between 35-54 (35%), followed by 18-34 (34%). Interestingly, most purchasers skew strongly towards metropolitan areas (72%), specifically in NSW/ACT (26%) then VIC (27%). Those with an Asian background account for 22% of papaya purchasers, and over index significantly versus those with Asian backgrounds that do not buy papaya.

For a copy of the 'Farmer Content Guide' or to feature your grower content on papaya social media, email Marketing Lead, Elisa King, or the agency at: lana@bitecom.com.au.

Hort Innovation
Strategic levy investment

PAPAYA FUND

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



Amanda Arbuckle's husband Ken.



Amanda Arbuckle (centre).

GROWER PROFILE:

Amanda Arbuckle, Innisfail

Amanda Arbuckle made the move back to Innisfail in Far North Queensland in 2016, after she and her husband purchased a papaya farm; expanding their family run papaya business from five to forty acres.

Her parents have run a papaya farm there since 1986, and even though the long and strenuous hours remain unchanged, Amanda has noticed many aspects of papaya farming that have changed significantly since her childhood.

“When I was a kid, we had flat-pack boxes delivered that we had to fold and staple together. The finished pallets of fruit were driven on the back of the ute to meet the train once a week. Now, we have preassembled trays delivered and completed pallets of fruit are collected from our shed by the transport company daily.

Although some aspects of papaya farming have become more efficient, harvesting and packing the fruit is still labour intensive. Our workforce has changed considerably to reflect the needs of our growing farm and we

now employ a team of backpackers to help with the many aspects of papaya farming including planting, weed control and harvesting. Since joining the family farm, we have incorporated technology into our farming practices by using the iPad to record and track our production and camera drones to help monitor the health of the crops. We are also trialling the use of a spray diary and chemical inventory apps.”

Off the back of latest research conducted by Hort Innovation on Papaya consumer research PP17001 earlier this year, Amanda said there is huge potential for growth in the papaya industry, and sees tremendous value in trying to connect with consumers from different target demographics.

Last year, Amanda represented growers and volunteered her time attending a ‘Pregnancy, Babies and Children’s Expo’. “I thought it was a great opportunity to represent growers, and was very worthwhile having someone who could relate to pregnancy, and showcase the produce,” she said.

“Papaya is such a versatile fruit that’s very nutritious. But, I have found that there’s a lot of confusion surrounding papaya; with people not knowing when it’s ripe, or how easy it is to prepare.

I think that potential value lies in targeting the right group of people, such as the hip, younger, and more health-conscious demographic – just consider what they did for the avocado industry.

Increasing consumer demand and targeting the next generation with more effective marketing and promotion that highlights just how easy they are to consume is the way forward.”

The family-run farm has seen a decrease in production this winter, mainly because of the cold weather. “This year we have lost many trees to dieback, causing production to slump significantly. Papaya are fickle plants and no one really knows why they have succumbed to dieback this year.” However, they are expecting production to increase soon, coming into peak growing period. With the warmer weather, the unsightly



Amanda Arbuckle's husband Ken and son Archie.

winter spot on the skin of the fruit clears up; minimising waste through discarded fruit.

As growers, they are passionate about minimising pesticide use and ensuring their business is as environmentally sustainable as possible.

The papaya grown on their Innisfail farm is distributed to both fruiterers and supermarket chains in Queensland, New South Wales, Victoria and South Australia.

Domestic demand for their fruit has increased, however this hasn't translated to the international market.

While they've tried to export to New Zealand a couple times, Amanda said it wasn't overly successful; with the cold New Zealand weather being a key problem, as the fruit struggles to ripen successfully.

A closer look on how to increase consumer demand for the domestic market is where Amanda sees potential for industry growth, and having relocated back to Innisfail she's back in the thick of it and perfectly positioned to help make it happen.

R&D UPDATE: Discovering sweet genes in papaya

CHAT KANCHANA-UDOMKAN, MAI NANTAWAN AND REBECCA FORD, GRIFFITH UNIVERSITY

Along with flavour, sweetness is an important papaya fruit quality trait that needs to be preserved at point of sale; particularly sweetness that is derived from sucrose. This is directly regulated by a suite of genes involved in sucrose synthesis that are likely varied in their expression during fruit maturation, leading to differences in sweetness following fruit harvest.

To better understand genetic importance for sweetness selection, nine 'sweetness genes' were identified and assessed in foliar and fruit of sweet (Sunrise Solo) VS non-sweet (RB2) papaya, that were picked over a series of fruit maturity stages; shown in **Figure 1**.

Findings indicated that most of the genes were expressed at higher levels in the sweeter cultivar 'Sunrise Solo'; where sucrose accounted for 40-60% of the total sugar detected within the fruit. To further understand the potential to use the functional sucrose-related genes for sweetness selection, their likely locations were determined on a genetic map of the papaya genome of a Sunrise Solo x RB2 cross.



Ms Mai Nantawan, a PhD candidature aligned with the papaya breeding project, receiving the "2018 Young Minds Award" at International Horticulture Congress in Istanbul.

These were associated with sweetness-related quantitative trait loci (QTL). Several sequences were identified for use in breeding to speed up the selection of the sweetest material.

This research, conducted as part of PP15000 'New genetic targets to improve quality in Papaya', was presented at the International Horticulture Congress in Istanbul by Ms Usana (Mai) Nanatwan, for which she was awarded the '2018 Young Minds Award' for the best oral presentation.



Papaya fruits at five ripening stages, from mature green to fully ripe; as used in sweetness gene expression study. Top: RB2. Bottom: Sunrise Solo.

REGIONAL ROUND-UP

INNISFAIL, QLD – Joe Zappala

The last three months in Innisfail have seen a cooler and longer winter than what we'd normally see in the tropics. There has been lower than average rainfall over the last three months. This has raised concerns as to the availability of water for irrigation if the dry weather continues into the new year. The production is expected to increase significantly over the next month. With these dry conditions, disease pressure is at low levels and fruit quality is excellent!

CARNARVON, WA – Annie van Blommestein

Pawpaw production in Carnarvon has continued to be steady this season and tree health has been maintained with the good supply of fresh water from the Gascoyne River. A few new plantings have replaced older blocks that had reached the end of their productive life, with total area remaining steady. Growers have been sending both green and ripe fruit to market and quality has been good. The CGA RBG baiting team and sterile fly release program coordinated by DPIRD, together with good industry involvement has led to further reduction in the monitored numbers of wild Mediterranean fruit flies, which is good news for all growers in the district and puts total eradication on target for the near future.

TABLELANDS, QLD – Gerard Kath

Papaya production on the Tablelands is ticking over as per usual. Harvesting has been steady to a little slow of late due to both the prolonged cold winter and some crop failures due to individual specific circumstances.

However, things are rapidly turning a corner as harvesting is shortly reaching a peak for the months of September, October and November.

Fruit coming on line should be of good quality in terms of eating and shelf life, yet appearance may not be at a premium due to the prolonged cold and exceptional dry days. Cool nights, warm to hot days as well as dry windy days lead to a greater amount of skin blemishes or winter freckle.

In general, I'm seeing a large volume of fruit to hit markets from now until December and beyond that it is difficult to say as the wet season will have the final say.

In other news a few of the larger growers are expanding and there are a few new growers coming on board, which will make for interesting times ahead.

TULLY, QLD – Daniel Mackay

The Tully papaya growing region has experienced a cold and dry winter off the back of a heavy wet season. This has resulted in reduced production and a higher percentage of large fruit. However, the long cool dry winter has allowed for good planting conditions and great strike rates.

Some Tully growers have seen benefits from heavy mulching, which has suppressed weeds in their plant crop and increased soil moisture; important for the oncoming hotter months. Quality throughout the winter season was good with small amounts of winter freckle evident. Coming out of winter and into the spring months, the fruit is colouring up with glowing clean skin. In September a spring flush is typical for the Tully growing region and this year will be no different; the next few weeks should see production volumes increase.

Want to submit an update from your growing region? Email industry relationship manager Christian: christian.patterson@horticulture.com.au

Exporting growth through levy funded 'Papaya Industry Export Market Development Strategy 2023'

Continued from page 1

AUSTRALIA: CURRENT PAPAYA MARKET

There are 130 commercial papaya growing farms across Australia. Majority of production occurs in Australia's North, throughout Queensland, with some growers in the Northern Territory and Western Australia.

For the year ending June 2017, 18,318 tonnes were produced; only 57 tonnes of this was exported, with 93% of these exports going to United Arab Emirates.

With Australian papaya exporting remaining small and in flux, the export price remains at the same level as domestic pricing, with an average cost of \$3.04 per kilogram.

BEST MARKET PROSPECTS

Potential export markets by 2023 as outlined in the development strategy

1. **Qatar:** Rapidly growing market but price sensitive.
2. **Bahrain:** Rapidly growing market but price sensitive.
3. **New Zealand:** Small and declining market, but the opportunity exists to build programmed supply.
4. **UAE:** Small volume but attractive pricing if specific niches can be targeted.
5. **Hong Kong:** An open market that is easy to trade with, where a premium positioning could be built for Australian papaya.

EXPORT BARRIERS

Several key market barriers exist; impacting the development of Australia's papaya export market. Including, but not limited to:

- Underdevelopment of industry export supply chain
- Demands of domestic industry market aren't being fully met
- Long distance travel is difficult due to soft skin of papayas
- Airfreight is necessary due to short, 2-week shelf life
- Export and domestic price are very similar
- High attention to detail is required in packing export orders
- Global competitiveness remains difficult with high Australian labour and compliance costs, and
- Global competitors' proximity and access to potential development markets.

Hort Innovation
Strategic levy investment

PAPAYA FUND

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

Minor use permits

Get the latest information on minor use permits in this extract from the Hort Innovation Papaya Fund 2017/18 Annual Report. The full document including all levy insights from across the financial year is available from www.horticulture.com.au/fund-annual-report-portal.

While the use of pesticides and other chemicals in the horticulture industry is being modified through the increasing uptake of integrated pest management approaches, there remains a need for the strategic use of specific chemicals.

Chemical companies submit use

patterns for product label registrations to the Australian Pesticides and Veterinary Medicines Authority (APVMA) – however the papaya industry is generally provided with limited label registrations because of its ‘minor’ crop status in this area (meaning the chemical companies can consider the market size too small to generate adequate commercial returns, based on the R&D investment required). This is where minor use permits come into play. The APVMA’s national permit system adds some flexibility to the approval process and provides a legal framework that can allow access to products for minor use purposes.

Permits in 2017/18

During the 2017/18 financial year, a successful application for new permit PER85397 was prepared by Hort Innovation and submitted to the APVMA, facilitated through the *Papaya industry minor use program* (PP16000).

The minor use program also saw the renewal of PER14098, PER14097 and PER13671, the latter renewal supported by data from the project *Generation of residue data for pesticide minor use permit applications in horticulture crops 2015/16* (ST15027).

Details for these permits can be found in the table below.

Current permits: Below is a list of minor use permits for the papaya industry, current as of September 1, 2018.

Permit ID	Description (chemical/crop/pest or use)	Original date of issue	Expiry date	Permit holder
PER12592	Chlorothalonil and difenoconazole / Papaya / Black spot and Brown spot	14-Aug-11	30-Jun-20	Growcom
PER13076 version 2	Propamocarb / Papaw or papaya (seedlings) / Damping off	05-Apr-12	31-Mar-22	Papaya Australia C/Hort Innovation
PER13158 version 9	Dimethoate / Specified citrus and tropical fruit commodities (inedible peel, post-harvest) / Various fruit fly species	06-Oct-11	06-Mar-19	Hort Innovation
PER13671 version 3	Beta-cyfluthrin (Bulldock 25 EC) / Papaya / Fruit-spotting bug and banana-spotting bug	28-Nov-12	28-Feb-23	Papaya Australia C/Hort Innovation
PER14098 version 2	Etoxazole (Paramite Selective Miticide) / Papaya / Two-spotted mite	03-Oct-13	30-Jun-23	Papaya Australia
PER14097 version 3	Abamectin and fenbutatin oxide / Papaya / Two-spotted mite	31-Oct-13	30-Jun-23	Papaya Australia
PER12450 version 6	Trichlorfon / Specified fruit crops / Fruit fly	06-Oct-11	31-Jan-21	Growcom
PER14417	Copper as hydroxide / Papaya / Papaya fruit rot	28-Feb-14	31-Mar-19	Papaya Australia C/Hort Innovation
PER14490 version 2	Metalaxyl-M (Ridomil Gold), metalaxyl (Zee-mil) + phosphorous acid / Papaya / Phytophthora root rot and Pythium	04-Apr-14	31-Mar-22	Papaya Australia C/Hort Innovation
PER13859	Dimethoate / Orchard clean-up – fruit fly host crops following harvest / Fruit fly	09-Feb-15	31-Jul-24	Growcom
PER80746	Ethephon / Papaya / Fruit de-greening	18-Aug-15	31-Aug-20	Papaya Australia
PER85397	Sulfoxaflor (Transform) / Lychee, mango, papaya, passionfruit (field grown) / Fruit-spotting bug and banana-spotting bug	09-Feb-15	31-Jul-24	Hort Innovation

All efforts have been made to provide the most current, complete and accurate information on these permits, however you should always confirm all details on the APVMA website at portal.apvma.gov.au/permits. Details of the conditions of use associated with these permits can also be found on the APVMA site.

Minor use permit updates are circulated in Hort Innovation’s *Growing Innovation* e-newsletter, which levy-paying members receive monthly. Not a member? Sign up for free at www.horticulture.com.au/membership.

Scientists aim to perfect pollination



Better understanding of papaya pollination is critical to prevent population deficits during challenging seasons.

Two Brisbane-based scientists, Brian Cutting and Dr Lisa Evans, discuss their research on pollination; what we know and what we need to find out.

What is pollinating your papaya crop? Are you achieving optimal pollination or are some flowers under-pollinated? What can you do to make sure you are? You're not alone if you can't answer all these questions confidently. Crop pollination can be complicated and there are still many aspects of papaya pollination that are not well understood.

One outstanding question relates to the degree of honey bee pollination in papaya crops. Honey bees are the most readily available managed pollinator in Australia, and their populations are bolstered by feral colonies. However, previous research on the role and importance of honey bees in papaya pollination is conflicting. They are susceptible to many diseases and parasites which can reduce their availability. One such parasite is the varroa mite, which kills honey bee colonies unless treated. Australia is the last major growing region in the world without varroa, and when it arrives here the industries which rely on honey bee pollination will dramatically change.

Plant & Food Research Australia (PFRA) is working to ensure that Australian industries, like papaya, are ready for potential changes in



Using night vision video cameras, we can study the movement of hawk-moths on papaya flowers. On many farms nocturnal pollination is important for papaya production.

pollination services. We are part of the Hort Frontiers Pollination Fund; an initiative to optimise (and varroa-proof) pollination across multiple Australian cropping industries through project PH15000 'Strengthening and Enabling Effective Pollination for Australia'. We are two Brisbane-based scientists on the Pollination and Apiculture team, conducting research to better understand and improve pollination throughout Australia and New Zealand, with our primary focus being on horticulture in Queensland. Our work aims to prevent pollination deficits with landscape changes, and to develop strategies that maximise pollination in our current climate. With adequate pollination, growers can expect enhanced yields and improved fruit quality; producing fruits of larger size, better shape, and in some cases, better flavour.

Papaya pollination promises to be an interesting topic for future research, particularly looking at the role of honey

bees and stingless bees as pollinators, and how papayas quite uniquely benefit from nocturnal pollination by moths in many growing regions such as Australia. We have observed hawk-moths visiting flowers on QLD plantations, but many growers may not be aware of the quantity in their orchards because of their nocturnal habit and short period of activity. The impact of these insects on papaya production across regions and varieties is not yet fully understood. We aim to determine how substantially honey bees contribute to papaya pollination and to better understand moth pollination; investigating methods to enhance their population during challenging seasons.

Production methods can significantly influence pollination dynamics on a farm. Current information is largely collected from farms with varieties that have separate male and female plants. However, farms with hermaphroditic plants, that have both male and female flower parts in one plant, are likely to have completely different pollination requirements, and may not be dependent on insect pollination at all. Opportunity therefore lies in the ability to achieve higher and more consistent yields with certain management practices. Understanding the pollination differences of these plants is a priority for our research to guide best management strategies and minimise future risk of failure.

We are actively seeking growers to participate in this important research on pollination. If you'd like to get involved or share your insights, we can be contacted via email at:

brian.cutting@plantandfood.co.nz



Strengthening and Enabling Effective Pollination for Australia (PH15000) is funded by the Hort Frontiers Pollination Fund, part of the Hort Frontiers strategic partnership initiative developed by Hort Innovation, with co-investment from The New Zealand Institute for Plant and Food Research Limited and contributions from the Australian Government.

PAPAYA PRESS

ISSUE 3 - MAY 2019

PAPAYA CLEAN SEED PROGRAM UNDERWAY

Dr Paul Campbell

Beginning in late 2018, the papaya clean seed program (PP18001) will deliver a clean seed protocol to help protect the papaya industry against papaya sticky disease.

Papaya meleira virus 2 (PMeV2) is a seed-transmissible virus that is associated with symptom development in papaya sticky disease. Investigations have found the virus in plant lines used to generate seeds for the industry, raising the need for a clean seed program.

The program's key research provider, the Department of Agriculture and Fisheries Queensland (DAF) will be looking at other causal agents of the disease as well as raising awareness of the issue and the steps being taken to remove contaminated seed from as many breeding lines as possible.

One of the key aspects of the project's methodology is the investigation of ways to eliminate the virus from papaya plantlets for creation of virus free plants. A series of follow up screening processes will aim to ensure disease free status remains.

Lead researcher in the project for DAF, Dr Paul Campbell, said the clean seed program was an important project for industry, as any efforts to improve knowledge of papaya sticky disease in Australia will inform management options for future seed production processes.

"We know that papaya sticky disease is reported to be seed transmitted

at a high frequency. As part of this project we'll be looking at alternative approaches for the generation of clean lines, such as embryo rescue which may involve thermotherapy and chemotherapy.

"Growers also have an important role to play in ensuring plants producing clean seed are kept separate from other areas of contamination.

"The bottom line is that without access to virus-free planting material, disease pressure continues to be high which will impact on growers' yields and profitability," he said.

The project is set to conclude in August 2021.

AIMS AND OUTCOMES FOR THE CLEAN SEED PROGRAM:

Project Aims	Project Outcomes
Develop a clean seed testing protocol targeting causal agent(s) of papaya sticky disease	Virus-free seed for select commercial cultivars for the Australian papaya industry within two years following the project completion
Generate clean seed for lines and varieties of importance to industry	Clean seed protocol for implementation for verification of seed disease status
Undertake activities to improve knowledge of papaya sticky disease in Australia	Increased knowledge and understanding of causal agents of papaya sticky disease



The clean seed program is one way of protecting the papaya industry against sticky disease

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This magazine is funded by Hort Innovation using the papaya R&D levy and contributions from the Australian Government.

Hort Innovation is the grower-owned, not-for-profit research and development corporation for Australian horticulture.

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**Hort
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Strategic levy investment

**PAPAYA
FUND**

HORT INNOVATION'S NEW STRATEGIC PLAN

Hort Innovation is in the process of developing a new Strategic Plan, which will be launched in mid-2019, replacing the current one.

In developing the plan, 20 stakeholder workshops were held around the country and an online form enabled growers who couldn't attend a workshop to provide their thoughts and ideas on how Hort Innovation invests levies on behalf of the sector.

There were four key questions posed to prompt discussion, including:

- What are the most important priorities for Hort Innovation?
- What are the top goals for Hort Innovation?
- What are Hort Innovation's strengths?
- What are Hort Innovation's obstacles?

This consultation is separate to that undertaken for the individual levy fund Strategy Investment Plans (SIPs) that were created during the last two years, and for the SIPs that will be developed in the future.

Stay tuned for more information on the new strategic plan following its launch!

From the Chair

GERARD KATH

Dear papaya post readers.
Welcome to this 3rd edition of Papaya Press.

As is the case for most growers, weather is the predominant variable which greatly affects grower profitability. It is weather that affects yield and quality which affects price. The last 3 months has again seen a significant wet season with above average rainfall. Trees will be under stress and fruit quality has been affected with Phytophthora, anthracnose, water rot and poor shelf life all playing a part in grower returns. The worst of the wet season is normally behind us by the end of March, however in wet years like this year it is likely to linger on a month longer. Hopefully by the time this is being read, the sun is shining and fruit is on the improve.

Industry growth still seems to be occurring across the board. Seed sales are back a bit but plantings are quite large from self-grown seed and tissue



culture. As has been the case for the last 10 years, the expansion is in red lines across the coast, tablelands and Lakeland. It doesn't seem to be getting any easier growing this crop with increasing pressure from fruit spotting bugs, red spider mites, black spot, fruit rots and papaya sticky disease all contributing in the day to day challenges in producing quality fruit.

Keeping up with compliance requirements is also a constant challenge for growers. QA, workplace safety and environment are some of the areas that seem to be going through a growth area for employment. There seems to be a never ending higher level that, mainly supermarkets, are pushing for. In the case of QA, the HARPS accreditation scheme is a typical example of extra compliance with poorly thought through effects and outcomes. HARPS could have easily been avoided by simply having different levels of freshcare to cater for different market requirements. I understand that all consumers see safe food as important, however I wonder if the sterile levels being aimed for are sensible and healthy for all consumers. The other question is, did the high level of QA really help the strawberry industry in the needle affair?

Until next issue.

Best regards.
Gerard Kath



The wet season made things somewhat challenging at Lecker farming!

Horticulture Statistics Handbook released



The papaya industry now has access to the latest industry data following the release of the 2017/18 Horticulture Statistics Handbook (AH15001).

Released by Hort Innovation, the Handbook features information drawn from several supply chain and trade sources and includes data on more than 70 horticultural products including fruit, nuts, vegetables, nursery, turf and cut flowers.

Across all Australian horticulture industries, the total value of production was \$13.2 Billion, with fresh horticulture exports valued at \$2.15 billion – around 6 per cent higher than in the previous year.

Hort Innovation General Manager for Research, Marketing and Investment, David Moore, said the Handbook provided an in-depth overview of how the horticulture industry was performing at large, with a targeted focus on fresh market supply values and volumes by product, import and export dynamics, and the identification

of key production regions and seasonality.

Produced for a fourth time, the Horticulture Statistics Handbook provides important data for industry, researchers and decision makers, while supporting policy formation and contributing to further research that will benefit the industry.

Papaya Australia Chairman and Mareeba grower Gerard Kath said the organisation's vision for a profitable papaya industry that consistently delivers high quality fruit which exceeds consumers' expectations was supported by projects such as the statistics handbook.

"Having up to date across horticulture industry data as well as papaya specific information makes it much easier to look to united activities such as R&D and marketing projects that bring benefit to the entire sector," Mr Kath said.

The Handbook is available now on the **Hort Innovation website**.

PAPAYA INDUSTRY STATISTICS 2017/18: A SNAPSHOT

- 16,196 tonnes of red papaya and yellow pawpaw was produced
- Farm gate value was \$31.4 m while the wholesale value of the fresh supply was \$37.2 m
- The supply per capita was 645 g based on the volume supplied
- Australia imported 131 tonnes of fresh red papaya and yellow pawpaw. These imports came from Fiji (103 t) and Thailand (28 t)
- Australian exported 16 tonnes of fresh export, all coming from Queensland
- Red papaya accounted for 65% of fresh production, yellow pawpaw 35%
- New Zealand is the main market for exported fresh red papaya and yellow pawpaw taking 86% and Oman the second biggest market receiving 14% of fresh exports from Australia

Papaya consumption data at your fingertips

Did you know that one in ten households purchased papaya/papaw in the last year and that just over 45% of these purchases were from the major supermarkets?*

Your papaya levy contributes to the development and updating of the Harvest to Home dashboard and the latest data on papaya consumption is now available for the first time.

Harvest to Home is an analytics tool developed by Nielsen and Hort Innovation, which shares consumer insights in one simple dashboard. It's public, free and simple to use, with all the information able to be downloaded to keep and refer to at a later time. It can also be viewed on multiple devices, including smartphones, tablets and desktop computers.

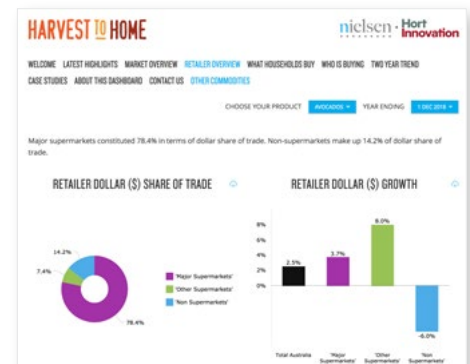
In addition to the hundreds of data points available in the dashboard, case studies and insights on specific fruit, vegetables, mushrooms and nuts are continually uploaded.

This multi-industry investment, under project *Consumer behavioural and retail data for fresh produce* (MT17015) provides regular consumer behaviour

HARVEST TO HOME

data and insight reporting to a range of industries, including the papaya industry.

The information is intended to assist growers and supply chain partners in decision-making for their businesses, such as being better informed about market opportunities, and better understanding the needs and expectations of the modern Australian shopper.

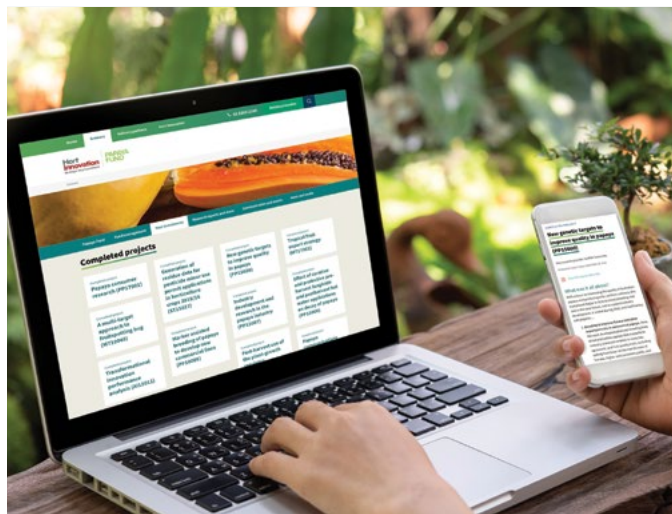


The data and insights provided through Harvest to Home also support strategic activities, including Hort Innovation Papaya Fund marketing plans.

The category update report for papaya is now available and in late August, a deep dive review will also come online. Visit the Harvest to Home dashboard at www.harvesttohome.net.au

* Source: Nielsen Homescan 52 weeks ending 23/03/2019 (Major supermarkets defined as Coles + Woolworths + Aldi)

This project (MT17015) has been funded by Hort Innovation, using the apple, pear, banana, mushroom, avocado, mango, table grape, cherry, citrus, summerfruit, macadamia, lychee, pistachio, pineapple, papaya, almond, raspberry, blackberry and strawberry research and development levies, and contributions from the Australian Government. Hort Innovation is the grower-owned, not-for-profit research and development corporation for Australian horticulture.



The Papaya Fund has a new website

Hort Innovation's new website allows the papaya industry to find more information and more resources quickly and easily.

Six pages of industry-specific content provide you with:

- Up-to-date details on levy fund management
- All ongoing investments with updates, advice and actions you can take now
- Completed investments with user-friendly summaries, final research reports and more
- More resources, information and tools than ever before
- Ways to connect with industry and people you can contact now.

NEW – completed investments:

- View a user-friendly summary of what the investment achieved
- Download the final research report with in-depth information
- Access fact sheets, publications and other tools and resources that were developed as part of the investment.

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horticulture.com.au/papaya

Minor use permits

While the use of pesticides and other chemicals in the horticulture industry is being modified through the increasing uptake of integrated pest management approaches, there remains a need for the strategic use of specific chemicals.

Chemical companies submit use patterns for product label registrations to the Australian Pesticides and Veterinary Medicines Authority (APVMA) – however the papaya industry is generally provided with limited label registrations because of its ‘minor’ crop status in this area (meaning the chemical companies can consider the market size too small to generate adequate commercial returns, based on the R&D investment

required). This is where minor use permits come into play. The APVMA’s national permit system adds some flexibility to the approval process and provides a legal framework that can allow access to products for minor use purposes.

Through the Hort Innovation Papaya Fund’s *Papaya industry minor use program* (PP16000), levy funds and Australian Government contributions are used to submit renewals and applications for these minor use permits to the APVMA, as required.

All current permits for the industry are in the table below. Before use, it is recommended that you confirm the details of the permits through the APVMA website at <https://portal.apvma.gov.au/permits>.

UPCOMING MINOR USE PERMITS

When available, details on all newly issued or renewed permits are circulated in Hort Innovation’s monthly *Growing Innovation* e-newsletter, which levy-paying members receive monthly. Not a member? Sign up to the free membership program at <https://www.horticulture.com.au/growers/become-a-member/>. Any new or renewed permits will also be searchable, along with all other current permits for the industry, at <https://portal.apvma.gov.au/permits>.

At the end of each financial year, the Hort Innovation Papaya Fund Annual Report also provides a wrap-up on all permits that have been supported by the levy throughout the year. Keep a look out for this towards the end of 2019.

MINOR USE PERMITS CURRENT AS OF MARCH 15, 2019

Permit ID	Description (chemical/crop/pest or use)	Original date of issue	Expiry date	Permit holder
PER12592	Chlorothalonil and difenoconazole / Papaya / Black spot and brown spot	14-Aug-11	30-Jun-20	Growcom
PER13076 Version 2	Propamocarb / Papaw or Papaya (seedlings) / Damping off	05-Apr-12	31-Mar-22	Papaya Australia C/Hort Innovation
PER87164 Version 2	Dimethoate / Specified citrus and tropical and subtropical inedible peel fruit commodities - post-harvest dip or flood spray / Various fruit fly species	1-Mar-19	31-Mar-24	Hort Innovation
PER13671 Version 3	Beta-cyfluthrin (Bulldock 25 EC) / Papaya / Fruit-spotting bug and banana-spotting bug	28-Nov-12	28-Feb-23	Papaya Australia C/Hort Innovation
PER14098 Version 2	Etoxazole (Paramite Selective Miticide) / Papaya / Two-spotted mite	3-Oct-13	30-Jun-23	Papaya Australia
PER14097 Version 3	Abamectin and fenbutatin oxide / Papaya / Two-spotted mite	31-Oct-13	30-Jun-23	Papaya Australia
PER12450 Version 6	Trichlorfon / Specified fruit crops / Fruit fly	06-Oct-11	31-Jan-21	Growcom
PER14417 Version 2	Copper as hydroxide / Papaya / Papaya fruit rot (Phytophthora)	28-Feb-14	31-Dec-24	Hort Innovation
PER14490 Version 2	Metalaxyl-M (Ridomil Gold), Metalaxyl (Zee-mil) + Phosphorous acid / Papaya / Phytophthora root rot and pythium	4-Apr-14	31-Mar-22	Papaya Australia C/Hort Innovation
PER13859	Dimethoate / Orchard clean-up - fruit fly host crops following harvest / Fruit fly	9-Feb-15	31-Jul-24	Growcom
PER80746	Ethephon / Papaya / Fruit de-greening	18-Aug-15	31-Aug-20	Papaya Australia
PER85397	Sulfoxaflor (Transform) / Lychee, mango, papaya and passionfruit (field grown) / Fruit-spotting bug and banana-spotting bug	17-Apr-18	30-Apr-23	Hort Innovation

Data generation for papaya

The generation of pesticide residue, efficacy and crop safety data is required to support label registration and minor use permit applications made to the APVMA.

Here is where the papaya industry is benefitting through the Hort Innovation project *Generation of data for pesticide applications in horticulture crops 2018* (ST17000). Its papaya-related work is funded through a grant secured by Hort Innovation, via the Federal Government's Access to Industry Uses of Agricultural and Veterinary (Agvet) Chemicals program.

As with similar projects in the past, ST17000 is responsible for generating the required data for a range of registration and minor use applications across a variety of horticulture crops. For papaya, it is working towards supporting a Syngenta label registration application for Scholar (Fludioxonil) for the control of anthracnose. Its data will also support a Dow crop-group registration application for Transform (Sulfoxaflor) for fruit-spotting and banana-spotting bugs, which will involve papaya. This work is due for completion in 2020.

The papaya industry will also benefit from the data generated through *Generation of residue, efficacy and crop safety data for pesticide applications in horticulture crops 2017* (ST16006).

GROWER SURVEY: WE WANT YOU!

As part of the Australian Papaya Industry Communications Program (PP16001) a grower survey is being conducted in June.

Look out for an email in your inbox next month that will contain a link to a short survey on your views of the communications program. The survey will include questions on the content covered in the Papaya Press as well as your views on the areas of focus for R&D investment and if you've adopted any of the research findings under the R&D program.

We'd love to hear from you!

REGIONAL ROUND-UP

INNISFAIL, QLD – Joe Zappala

The wet tropics region has had a few problems because of the wet season. Some growers have had quality issues with their fruit. Phytophthora and Anthracnose are the main issues. Production is slightly down as a consequence of the heat wave conditions late last year. Quality and production is expected to rise in the next couple of weeks in time for Easter. Growers are also busy doing their autumn plantings before the weather cools off.

and lower fruit quality. December then saw good rainfall from storms, delivering ideal conditions, however the wet season has very much taken its toll now with above average rainfall being stressful for plants and resulting in poor fruit quality due to fruit rots and poor fruit shelf life.

The volume of plantings in the last 6 months has again been fairly high, being mainly with the larger growers. These plantings are now mainly in the red lines with yellow lines tapering back somewhat. I would anticipate there to be a large volume of fruit to come for the remaining year.

Regarding pests and diseases there has been a steady pressure from fruit spotting bugs, red spider mites, black spot and now anthracnose and phytophthora. The incidence of papaya sticky disease is still there showing up more in spring when plants are under most stress.

All in all, the outlook is still good for the coming year.

CARNARVON, WA – Valerie Shrubbs

In WA between 2017 and 2018, fruit volumes and prices have been similar, with perhaps a slight increase from 2017 to 2018.

Growers were also subject to poor summer cropping into the 2018/2019 summer with strong winds and some extreme temperatures, resulting in poor fruit set. In December we had a maximum temperature of 48.5 degrees, in January the mercury hit 44.8 degrees, in February it reached 42.8 degrees and 43.1 degrees in March.

There have been no major outbreaks of pest and disease, and encouragingly, the whole of district medfly control activities have been effective in reducing medfly strikes on fruit.

TULLY, QLD – Tayla Mackay

The Tully region experienced an extremely hot summer with temperatures reaching 43 degrees in November 2018. This caused a huge flower drop, leading to a significant decrease in production for February and March this year. Considering the loss of production, the fruit produced has been great quality with limited breakdown issues, bright colour and minimal skin markings.

Throughout autumn the Tully area is expecting stronger production volumes, with good quality and colour leading into the winter months.

TABLELANDS, QLD – Gerard Kath

Papaya production on the tablelands has been somewhat challenging in the last 6 months. This has been mainly due to very adverse weather conditions. The spring time was very hot and dry and now we've had an above average wet season. In October and November there were many weeks of temperatures in the high 30s and even into the low 40s. This together with no rain and very low humidity, resulted in tree stress

Want to submit an update from your growing region? Email industry relationship manager Christian: christian.patterson@horticulture.com.au

R&D UPDATE:

New varieties part of the long game for papaya industry



Commercial variety: Yellow 18



Advanced Breeding line: Moonlight 3

The future marketability and profitability of the Australian papaya industry is the key focus for researchers charged with developing new papaya varieties.

New red and yellow papaya varieties are continuing to be bred and evaluated under the *National papaya breeding and evaluation program* (PP18000). This program follows on from the investment in the project *New genetic targets to improve quality in papaya* (PP15000) which has now concluded.

The research team is focused on delivering new elite, genetically

stable cultivars that meet the needs of growers and the preferences of consumers, and that are adapted to key growing areas in northern Queensland, including the Tableland and coastal regions.

The overall aim is to produce genetic stable lines by 2020, then produce new F1 hybrids for both red and yellow papayas and ultimately, expand the marketability and profitability of the Australian papaya industry.

The program has partnered with the Centre for Nutrition and Food Science, Queensland Alliance for Agriculture and Food Innovation (QAAFI) and The

University of Queensland to identify the flavour of current commercial varieties compared to the new breeding lines.

Importantly, an additional collaboration with the Queensland Department of Agriculture and Fisheries is enabling the evaluation of disease reaction on the new advanced breeding lines.

A project reference group (PRG) has been formed between representatives of Hort Innovation, project leaders from Griffith University, researchers from research partner organisations and key growers from the industry. Project planning and strategic reporting meetings will be held bi-annually between the members of the reference group.

The broader papaya industry will be able to find out more about the project, including any outputs through annual field days, with all stakeholders encouraged to attend.

The next meeting of the PRG will be in July 2019 in Innisfail, with the next field day proposed to be in September 2019.

Hort Innovation
Strategic levy investment

PAPAYA FUND

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

60 seconds with Chat



Chat Kanchana-udomkan (PhD) is a research fellow for papaya at Griffith University and is leading the charge when it comes to breeding new papaya varieties.

Chat graduated a Ph.D. in Plant Biotechnology from Griffith University in 2015. She has been working on the papaya breeding program as a breeder since completing her degree. She was also employed as an Industry Development Officer for Papaya

Australia until 2018. Her research focuses on selective breeding using a molecular approach, including DNA markers, gene expression and QTL analysis.

Research activity has been targeted to improve the eating quality of red and yellow papayas. The aim is to produce new good and stable parental lines, leading to consistent and outstanding hybrid varieties. Her passion is to be able to apply research to the real world to improve the efficiency of agriculture.

PAPAYA PRESS

ISSUE 4 - NOVEMBER 2019



The Papaya clean seed program aims to better protect the papaya industry against papaya sticky disease (pictured).

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Papaya clean seed update

Dr Paul Campbell

Delivered by research provider the Department of Agriculture and Fisheries Queensland (DAF), the Papaya clean seed program (PP18001) works to deliver a clean seed protocol to help better protect the papaya industry against papaya sticky disease.

DAF researcher on the project, Dr Paul Campbell, provided a quick update on the progress towards improving understanding of the disease, and management options for future seed production processes.

The first plantlets produced under the clean seed project have tested negative to the virus PMeV2 Aus that causes papaya sticky disease. Initial stages of the project have focused on four parental lines, including the

parents of the popular red variety RB1. The plants were produced through embryo rescue and tissue culture, and when planted out, they were protected in insect proof caging to stop the virus coming in from outside. The initial lines put through this system had ~98 % virus-free plants.

The transmission of viruses by seed is never one hundred percent. Even if the seed is infected, the embryo inside the seed may not be, but the process of germination infects the seedling. By using embryo rescue, we eliminate that infection mechanism and increase the chances of getting clean planting material. Dr Chat Kanchana-Udomkan (Griffith University), has done a great job getting the embryo rescue system established for the different parent lines. Finding the right seed age for embryo rescue is critical to the success of the technique.

Next steps for the project are to establish tissue culture lines for long term protection of the clean mother plant lines and get more parent lines through the system. We will also be starting some basic virus transmission studies now that there are some virus free plants available.

Keep an eye out for more updates to come.

The 'Papaya clean seed program' (PP18001) is funded by Hort Innovation using papaya industry levies and funds from the Australian Government.

Hort Innovation
Strategic levy investment

PAPAYA FUND

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



Papaya Press Issue 4 was produced for Papaya Australia by Cox Inall Communications.

This magazine is funded by Hort Innovation using the papaya R&D levy and contributions from the Australian Government.

Hort Innovation is the grower-owned, not-for-profit research and development corporation for Australian horticulture.

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**Hort
Innovation**
Strategic levy investment

**PAPAYA
FUND**

See your levy at work!

Get an update on all new, current and recently completed levy-funded activity on the Hort Innovation Papaya Fund page at www.horticulture.com.au/papaya.

You can access easy-to-read project updates, a snapshot of the Papaya Fund, research reports and resources, key industry contacts and more. Don't miss the Hort Innovation 'Growers' section to keep informed on your levy investments, upcoming events, scholarship opportunities and other handy info!

Stay in the loop with your levy by becoming a member of Hort Innovation, the grower-owned, not-for-profit research and development corporation for Australian horticulture. Paying a levy doesn't automatically make you a member, but signing up is free at www.horticulture.com.au/membership.

From the Chair

GERARD KATH

Welcome to the fourth edition of the Papaya Press.

It has been a challenging year for papaya growers with environmental conditions, market pressures and pests and disease having a significant impact on quality, yield and profitability.



Each year and season seems to bring a new set of challenges. The papaya industry is facing unprecedented high yields per week during harvest. This is having a major impact on the wholesale price of papaya, which is currently coming in well under one dollar per kilo. Ultimately, it means growers are selling below harvest cost, which is not sustainable for the industry.

However, every cloud has a silver lining and this period of low prices is also resulting in large volumes hitting retail shelves. This high penetration could be an opportunity to grow market share and generate longer term consumer demand.

As for most growers, weather and environmental conditions have been the predominant variable affecting profitability. Record low temperatures in September, followed by record high prolonged temperatures in November impacted the flowering and setting of fruit. I'm hearing this has caused low

yields per tree on the coast, whereas we're seeing winter freckle and fruit blemish on the Tablelands.

In 2019, fruit quality has been affected by poor and inconsistent fruit set on both yellow and red papaya which is most likely due to environmental conditions. Papaya Sticky Disease remains a prominent issue, and more research & development is required to fine tune best-practice recommendations to better protect our crops.

Seed production has been occurring across the coast and Tablelands, which has been more challenging due to the impact of pests and disease. But it's great that work is currently underway to ensure growers are sourcing clean planting material.

In people news, Christian Patterson has left his role as Relationship Manager at Hort Innovation. We thank him for his contribution to industry and wish him the best.

It's great to read about the progress of levy funded projects in this edition of the Papaya Press and I look forward to seeing levy payers reap the benefits of these projects in the future.

I'll wrap up with my final comment, that although growers seem pessimistic about papaya production now, this fluctuation in yield and price has come and gone before and will ultimately level out.

Best regards,
Gerard Kath



From the Hort Innovation Office

with Outgoing Papaya Fund Relationship Manager **CHRISTIAN PATTERSON**

Papaya levy funded projects have seen great progress in 2019 as they work towards achieving key outcomes outlined in the 2017-21 Strategic Investment Plan (SIP).



We're pleased to say the portfolio is well committed, and that levy funds are being utilised effectively.

This year, four new members joined the Papaya Fund Strategic Investment Advisory Panel (SIAP), taking our panel from three to seven members.

Welcome to the following SIAP members:

- Amanda Arbuckle, A&K Arbuckle, QLD
- Tayla MacKay, Mackays, QLD
- Paul Fagg, Skybury, QLD
- Mark McLaughlin, Skybury, QLD

It has been very rewarding working on the Papaya Fund, and I wish everyone all the best moving forward.

To keep up to date with your levy and how it's being used, head to the 'For Growers' page on the Papaya Australia website.



MARKETING UPDATE: AUSTRALIAN PAPAYA IN STORE!

To support the Papaya Spring peak, Papaya Australia activated an instore sampling campaign from 2 September to 1 October 2019 as part of the 'Papaya consumer sampling program' (PP18502).

The intent of the activation was to:

- Strengthen interest in Australian Papaya
- Showcase how delicious ripe papaya is with a simple sampling methodology (fresh papaya with lime option).
- Facilitate immediate purchase by displaying the papaya on the stand (for shoppers to select) and highlighting their position in store.
- Help boost purchase frequency by promoting the unique health benefits and delicious recipes.

Sampling took place across 183 stores nationwide, split between Woolworths, Coles and Independents. Over the campaign period, a total of 26,233 samples were consumed with over 20,400 shoppers exposed to the Papaya Australia brand.

In comparison to the 2018 sampling campaign over the same season, average samples increased by +13% achieving increased efficiency. Consequently, the cost per sample improved to \$1.82 vs \$2.16 in 2018.



PAPAYA AUSTRALIA SOCIAL MEDIA UPDATE

As part of the FY20 social media plans, Papaya Australia continued to leverage Facebook while also establishing its Instagram account, @papayaaustralia to drive awareness, foster education and encourage consideration in purchasing papaya.

PLATFORM	MEASUREMENT	KPI TO JUNE 2020	ACHIEVED TO DATE
FACEBOOK	Impressions	2,400,000	627,184
	Average Engagement rate	>6%	14%
	Total Engagements (comments, likes or shares)	180,000	48,119
INSTAGRAM	Impressions	420,000	104,749
	Average Engagement rate	>15%	28%
	Total Engagements (comments, likes or shares)	84,000	21,642

* Impressions – the number of times your content is shown in a social media feed



This post had an impressive reach of 33,262 people and a huge engagement rate of 18%. Fans were responsive to this post with a huge number of comments expressing appreciation for our Australian papaya growers. The use of three images showing papaya at different stages of production was effective in engaging the target audience by sharing an insight into papaya farming.

**TOP
PERFORMING
FACEBOOK
POST IN
SEPTEMBER**



Panacea's Pantry's papaya chia pudding jar recipe was the best performing post for the month on Instagram. It received a significant engagement rate of 29% and a total of 20 saves. Fans engaged positively with the post, expressing their excitement to try the delicious breakfast. The beautiful layers in the jar and brightly coloured papaya were effective amongst the Instagram feed.

**TOP
PERFORMING
INSTAGRAM
POST IN
SEPTEMBER**





PAPAYA BREEDING PROGRAM UPDATE: Putting flavour front and centre

DR CHAT KANCHANA-UDOMKAN

Flavour is a complex trait that combines both mouth perception, as well as amounts and ratios of volatile compounds present in the flesh. To date this trait is highly subjective to descriptions, and there is no tool to accurately determine the trait.

This is one of the reasons that we have included flavour research within the current 'National papaya breeding and evaluation program' (PP18000) aiming to characterise in-depth the key flavour type preferences within the whole papaya chain and to develop a library of "chemical fingerprints" that will be used as a tool to differentiate flavour types.

There are two phases in the flavour research. The initial phase, working in partnership with the University of Queensland, is to identify flavour types of the current commercial varieties by harvesting from various regions by a trained panel. During this phase, our research will also look for volatile compounds that create unique aromas to each variety. The information collected will then be analysed to

identify any correlations between human and machine detections. The second and final phase aims to compare our new developed varieties to the current commercial ones and identify descriptive characteristics of the novel varieties. This information can then be used for marketing purposes when naming the new varieties.

The first phase of the research commenced in September this year. We collected 15 different fruit samples including RB1, RB4, Skybury, 1B and Hybrid 13, harvesting from various regions across Dimbulah, Mareeba and Innisfail. All the samples were delivered under commercial conditions of transport to Brisbane central market, where they were then delivered to QAAFI to ripen and be stored in a controlled temperature cold room for the testing period.

There will be two sessions across the testing period – training and formal. During the training session, a selected professional panel was given fruit samples and asked to describe aroma, appearance, flavour, texture and aftertaste. For example, there are

four types of aroma to be identified in papaya, these are: musty, sweet melon, raw pumpkin and metallic. The panel were given descriptions of each aroma, and a standard reference, such as rock melon for musty aroma. The panel are then asked to score each sample according to the reference type, ranking their intensity from none through to high. Once the panel was familiar with the sample and reference, they were given the sample for the formal session where each fruit sample was cut in half, one for the formal testing session, and the other half for volatile analysis.

The fruit for volatile analysis was transported to a molecular laboratory at Griffith University, Nathan Campus. Here it was sampled for volatile analysis, sugar composition, Brix and acid content. Through this testing, we are able to identify the aroma of papaya flesh using gas chromatography mass spectrometry (GC-MS). This is an analytical method to identify different substances within a test sample – providing you with information of various chemical compounds and their ratio within each fruit sample, which is unique to each variety.



Results from this initial phase will provide information on the effects of growing regions on flesh flavour, especially in RB1 variety, as well as seasonal effect to the flavour. Information collected from the machine detection will be analysed and correlated with the results from the professional panel testing, with the aim of identifying key volatile components of each variety that could be generated as chemical fingerprints of the principal sensory flavour identities.

As a companion to traditional breeding, “chemical fingerprinting” offers the potential to improve the accuracy of targeted flavour selection. Soon we will have more accurate descriptions to describe our papaya flavour and will be able to tell which chemical components play an important role in representing each flavour type. This could lead to the branding of papaya in the market to give consumers a clearer idea of that they’re paying for.

**Hort
Innovation**
Strategic levy investment

**PAPAYA
FUND**

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REGIONAL ROUND-UP

INNISFAIL, QLD – Joe Zappala

The last six months have been exceptional for the papaya industry on the wet tropics. We have had record high temperatures in February. The number of rain days this year have been greater than last year, but with less rainfall. We have also had an extended winter with some overnight temperatures in September the same as if it had been the middle of winter. The weather conditions have now returned to the long-term averages for this time of year with a drier than average spring expected.

The consequences of these weather extremes have delivered record low production on the wet tropics for the period from June to the end of September. Production has increased with the warmer weather. Quality now is excellent. Spring plantings are well underway with areas being planted the same as last year, if not slightly above. Production for the last quarter of this year is expected to be high with above average quality from the wet tropics.

TULLY, QLD – Daniel Mackay

The Tully region experienced an unusual long, cool and dry winter with temperatures recorded as low as 10 degrees in early September. Due to the cold winter production volumes were low, yet good fruit colour and minimal skin blemishing was recorded. Another effect this winter was the increased fruit size, yet the last few weeks have seen the profile returning to normal.

Pest and diseases are stable with the occurrence of papaya sticky

disease becoming less evident to non-existent.

With additional acres planted in the Tully region this year, production volumes will be strong coming into the new year.

TABLELANDS, QLD – Gerard Kath

Over the past couple months, papaya production on the Tablelands has seen great yield of fruit produced per week, with growers predicting an industry record.

In the first week of September we experienced extremely cold temperatures, which combined with dry air, more cold nights and windy conditions, has impacted fruit quickly of papaya, with skim blemish, winter freckle and cold burns being a problem across the Tablelands.

There will be a large volume of fruit continuing to hit the market as we lead into December. It's a challenging time for industry, with these high yields of fruit produced per week having a significant impact on price.

CARNARVON, WA – Annie van Blommestein

Pawpaw production in Carnarvon remains steady. At this stage, we haven't seen significant changes in the area under production.

Fruit is of good quality and is being picked for both the green and ripe markets.

Want to submit an update from your growing region? Email admin@australianpapaya.com.au

2019 Grower Communications Survey

As part of the *Australian papaya industry communications program* (PP16001), the annual grower survey was carried out in June – July this year.

The survey aims to give levy payers the opportunity to influence the future direction of the program; ensuring they're getting the information they want and need from levy-funded research & development and marketing projects.

The 10 survey questions were developed to gain feedback on the Papaya Press, the 'For Growers' webpage, as well as determine understanding of the levy and content preferences.

Thank you to the 10 papaya growers who participated in this year's survey – your insights are integral to the development of the communications program!

KEY SURVEY HIGHLIGHTS

- On average, respondents rated the May 2019 Papaya Press 7.7 out of 10.
- 90% of respondents said they would like to see more content on R&D outcomes in the Papaya Press.
- 70% of respondents would like to see more 'grower case studies' in future editions.
- 50% of respondents had accessed the 'For Growers' page since May.
- 80% of respondents thought there was enough information on the levy.
- Pest and disease management was shown to be a preferred content topic and was identified as a key issue for growers.

If you have any comments or story ideas for upcoming editions of the Papaya Press, please contact admin@australianpapaya.com.au

Minor use permits for the papaya industry

Get the latest information on minor use permits in this extract from the Hort Innovation Papaya Fund 2018/189 Annual Report. You can access the full document at: www.horticulture.com.au/fund-annual-reports.

The Hort Innovation Papaya Fund supports the submission of applications

for new and renewed minor use permits for the industry, as well as data generation activities to support chemical permits and registrations, and strategic agrichemical reviews. Together these efforts provide industry access to safe, relevant and effective chemicals for the management of pests, weeds and diseases.

Permits in 2018/19

During the 2018/19 financial year, successful renewal applications for PER13158 (issued as PER87164) and PER14417 were prepared by Hort Innovation and submitted to the APVMA, facilitated through the Papaya industry minor use program (PP16000).

Current permits: Below is a list of minor use permits for the papaya industry, current as of 19 September 2019.

Permit ID	Description	Date issued	Expiry date	Permit holder
PER12592	Chlorothalonil and difenoconazole / Papaya / Black spot and Brown spot	14-Aug-11	30-Jun-20	Growcom
PER13076 Version 2	Propamocarb / Papaw or papaya seedlings / Damping off	05-Apr-12	31-Mar-22	Papaya Australia C/Hort Innovation
PER87164 Version 2	Dimethoate / Specified citrus and tropical and sub-tropical inedible peel fruit commodities – post-harvest dip or flood spray / Various fruit fly species	01-Mar-19	31-Mar-24	Hort Innovation
PER13671 Version 3	Beta-cyfluthrin (Bulldock 25 EC) / Papaya / Fruit spotting bug and Banana spotting bug	28-Nov-12	28-Feb-23	Papaya Australia C/Hort Innovation
PER14098 Version 2	Etoxazole (ParaMite Selective Miticide) / Papaya / Two-spotted mite	03-Oct-13	30-Jun-23	Papaya Australia
PER14097 Version 3	Abamectin and fenbutatin oxide / Papaya / Two-spotted mite	31-Oct-13	30-Jun-23	Papaya Australia
PER12450 Version 6	Trichlorfon / Specified fruit crops / Fruit fly	06-Oct-11	31-Jan-21	Growcom
PER14417 Version 2	Copper as hydroxide / Papaya / Papaya fruit rot (Phytophthora)	28-Feb-14	31-Dec-24	Hort Innovation
PER14490 Version 2	Metalaxyl-M (Ridomil Gold), metalaxyl (Zee-mil) + phosphorous acid / Papaya / Phytophthora root rot and Pythium	04-Apr-14	31-Mar-22	Papaya Australia C/Hort Innovation
PER13859	Dimethoate / Orchard clean-up – fruit fly host crops following harvest / Fruit fly	09-Feb-15	31-Jul-24	Growcom
PER80746	Ethephon / Papaya / Fruit de-greening	18-Aug-15	31-Aug-20	Papaya Australia
PER85397	Sulfoxaflor (Transform) / Lychee, mango, papaya, and passionfruit (field grown) / Fruit spotting bug and banana spotting bug	17-Apr-18	30-Apr-23	Hort Innovation

All efforts have been made to provide the most current, complete and accurate information on these permits, however you should always confirm all details on the APVMA website at portal.apvma.gov.au/permits. Details of the conditions of use associated with these permits can also be found on the APVMA site.

Minor use permit updates are circulated in Hort Innovation's e-newsletter, *Growing Innovation*. Don't yet receive it? Sign up for free at www.horticulture.com.au/sign-up.

New strategy growing Hort Innovation into the future



Front and inside cover of the new Hort Innovation strategy

To kick off the new financial year, Hort Innovation released their 2019-23 Strategy, which will be used to guide the direction of the organisation for the next four years – providing a roadmap for current and future investments into research and development.

To inform the strategy, Hort Innovation gathered insights and feedback from over 350 growers and industry representatives across Australia through a series of 20 consultation workshops held earlier this year, as well as an online feedback system.

A strategy was then developed that supports and promotes the sustainability of the horticultural sector, driving future growth and

innovation for its industries.

Key activities flagged in the strategy place a focus on greater extension activities with more face-to-face grower engagement, the development of more sustainable farming practices to better future-proof horticultural industries, and better explore market expansion and trends.

Hort Innovation connects growers and consumers to drive demand and invest in solutions to improve productivity. These combine to increase the sustainability and prosperity of Australia's horticulture industries.

Download the 2019-23 Strategy at:
horticulture.com.au/corporate-governance/strategy-2019-2023/

THE STRATEGY AT A GLANCE

PURPOSE

Hort Innovation exists to drive a prosperous and healthy Australia, by providing the best knowledge and solutions to create a world-class horticulture sector.

GOAL

Hort Innovation is committed to sustainable growth in horticulture, with the overarching aim of increasing the sector's value to \$20 billion by 2030. This will be achieved through:

- Supporting growth in demand, both domestically and globally
- Supporting profitable and collaborative industries
- Delivering world-class innovation, knowledge and networks.

THE THREE STRATEGIC PILLARS:

1. Drive knowledge and innovation into horticulture industries
2. Deliver the highest value R&D, marketing and trade investments across industries, now and into the future
3. Enable activities that drive all strategies imperatives

Hort Innovation: Annual General Meeting 2019

Are you a Hort Innovation member that pays a statutory or voluntary levy, and have secured voting entitlements by completing an Annual Levy Return form?

If so, you have the right to vote at the AGM being held on Friday, 22 November at Pullman Sydney Airport.

AGM Details:

Date: Friday, 22 November 2019. Registrations open from 9:30am. Meeting commences at 12:00pm.

Location: Pullman Sydney Airport, 191 O'Riordan Street, Mascot NSW 2020

For more details on the 2019 AGM, head to:

horticulture.com.au/corporate-governance/agm-2019/

Across the day, three key events will take place:

- *Hort Innovation Showcase* will commence at 10am. This is an opportunity to learn more about Hort Innovation from its team members.
- *2019 Hort Innovation AGM* commences at 12:00pm. Voting members will elect an incoming Director on the Hort Innovation Board, with two more Board members appointed immediately following the AGM.
- *Workshop to shape new Extension & Adoption Function at Hort Innovation* will follow the AGM and run for 2-hours.

PAPAYA PRESS

ISSUE 5 - MAY 2020

Marketing & social media report

During the current pandemic, consumers have been showing an increasing interest in home cooking as well as their health. The Papaya Australia marketing activity seeks to be a supportive, positive influence for all home cooks and provide general meal ideas through social media channels.

Social Media

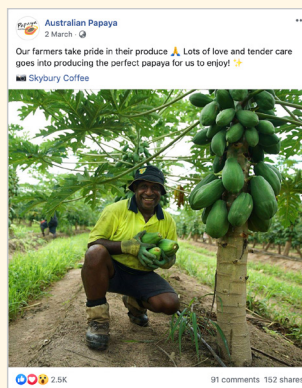
The Papaya Australia social media activity continues to attract and engage consumers and Australian papaya advocates. Below are the results from July 2019 to March 2020:

PLATFORM	MEASUREMENT	KPI TO MARCH 2020	ACHIEVED TO DATE
FACEBOOK	Facebook impressions	2,400,000	1,852,818
	Engagements	180,000	121,992
	Engagement rate	>6%	12%
INSTAGRAM	Instagram impressions	420,000	451,796
	Engagements	84,000	63,222
	Engagement rate	>15%	21%

* Impressions - the number of times your content is shown in a social media feed

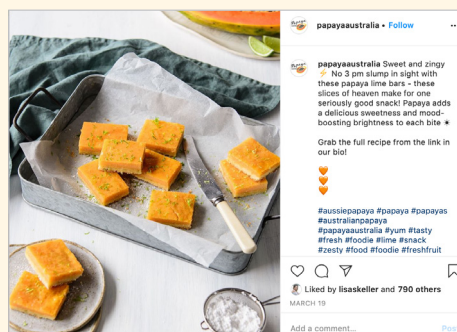
FACEBOOK: Top performing post for January to March

Grower posts have been performing well on Facebook. This post on 2 March reached over **21,000** people, with a **15%** engagement rate.



INSTAGRAM: Top performing post for January to March

Recipe inspiration has been a top performer on Instagram. This post on 12 March reached **4,800** people and received a **17%** engagement rate.



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Public Relations Campaign

To support the Autumn flush, the marketing team distributed a media release titled 'Boost immunity this autumn with healthy fresh papaya' to key media contacts. From this, they have secured an article on **Fruitnet**, a health tip in the 18 May edition of Women's Day, and recipes in the spring issue of Nourish Magazine.

The marketing team are proactively seeking online and print media coverage, which includes the follow standalone clippings:

- February 2020, **Over Sixty** shared the papaya parfait recipe, linking to the Papaya Australia website.
- March 2020, Australian Women's Weekly Food, published imagery, a ripening message and a link to the Papaya Australia website for their food bites section.



Papaya Press Issue 5 was produced for Papaya Australia by Cox Inall Communications.

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From the Chair

GERARD KATH

My thoughts are with those who have been impacted by COVID-19. The degree of challenges and changes that we are facing during this pandemic seem very hard to comprehend. I do believe that our industry was not spared completely, yet horticulture overall should fare ok. Let's hope we have seen the worst as far as negative market impact goes.



HORT INNOVATION

Hort Innovation have had some staff changes of late, with Paul Lilwall coming on as our new Industry Strategic Partner (ISP), and Ben Woodman being appointed to advise and manage the marketing budget. We welcome the new team and hope that it leads to a fruitful working relationship and good outcomes for industry.

I can report that a SIAP meeting was held in February, conducted by Corrine Jasper and Georgia Sheil from Hort Innovation. As our first meeting in 18 months, I felt that it was well run with productive action items such as Papaya communications and extension and nutritional analysis of fruit.

REEF REGULATIONS

Before COVID-19 hit, Reef Regulations for the protection of the Great Barrier Reef was a key topic. Members of the papaya industry have been watching and working closely with Cane, Bananas and all tropicals to gauge the likely impact that these regulations will have on our industry.

The challenge is finding the balance between cost and achieving a measurable outcome and developing a multi-layered approach to achieve reef health. Joe Zappala has taken a lead role in assessing possible implications for papaya, suggesting industry would first need a base requirement to be established and agreed upon before any mandatory compliance can be enforced.

Salmonella and Compliance

In February 2020 salmonella again raised its head in papaya. It's a difficult process determining the food source that caused the infection, but it was detected on 3 samples of papaya fruit tested. This is a timely reminder that salmonella detections can occur in papaya, and if it is the main source of infection it has massive consequences for the whole industry.

Safe Food Queensland visited North Queensland to provide an update on detections and industry practices, reminding growers to look at critical points within their own production system regarding Freshcare or HARPS.

“The degree of challenges and changes that we are facing during this pandemic seem very hard to comprehend. Let's hope we have seen the worst as far as negative market impact goes.”

SEASONAL OUTLOOK

Even amidst the uncertainty of COVID-19, my gut feeling is that there is significant production and supply coming for the remainder of the year, although there's uncertainty around price and demand.

We have been pushing to super charge the marketing program to promote the health benefits of our product to consumers and adapt to shifting shopping patterns among mainstream consumers, with the upswing of online shopping and home deliveries.

That's it for now. Stay safe and happy Papaya production for the year ahead.

Regards,
Gerard Kath

POST-HARVEST DECAY OF PAPAYA

Control and management strategies that look to lower the rates of post-harvest decay in papaya have long been a focus for Hort Innovation and the industry more broadly.

Though completed in 2016, the levy funded project ‘Effect of curative and productive pre-harvest fungicide and postharvest hot water applications on decay of papaya’ (PP13000) conducted by the Queensland Department of Agriculture & Fisheries (QDAF), continues to provide invaluable insights to growers looking to reduce loss caused by fungal diseases and enhance productivity.

PROJECT OVERVIEW

Seeking to manage and mitigate leaf diseases and reduce post-harvest rot, the project evaluated the effectiveness of regular foliar applications with pre-harvest protectant fungicides, the removal of disease infected fruit and leaves, and post-harvest hot water treatments.

Run by QDAF, the research was delivered through a series of trials conducted with growers in the Mareeba and Innisfail regions of far north Queensland.

Spray programs with protectant fungicides

There is a continued demand in the papaya industry for chemicals that protect against the establishment of dormant fungal infections and post-harvest decay.

Curative fungicides have been used to fight against dormant fungal infections as well as prevent their establishment. The curative fungicide, difenoconazole, is often used by papaya growers to control the foliar disease black spot, and this research project sought to

better understand its ability to prevent post-harvest decay.

Trials revealed that during the warm and wet summer months, spray schedules for the control of foliar disease provided a level of control for many of the post-harvest rots in papaya, however, including difenoconazole in a spray program demonstrated no benefits.

Removal of infected material and hot water treatments

Further post-harvest disease management practices assessed by QDAF included:

- the ability to reduce the spread of disease to healthy papaya fruits through the removal of infected fruit and dead leaf material, and
- the impact hot water dips has on disease control under controlled laboratory conditions.

The removal of dead leaves saw a reduction in disease inoculum levels in the trial crops although the direct impact of de-leafing in reducing post-harvest rot was minimal, proving ineffective in providing clear access to the fruit column during fungicide spraying and increasing the spray coverage required to control leaf diseases.

Hot water treatment trials identified temperatures between 50 and 52 degrees were optimal conditions for controlling disease, presenting a range of benefits including:

- Reduced need for post-harvest chemical fungicides
- Increased profit through reduced spoilage in supply chains
- The potential for fruit to be valued more highly because it had been produced with less impact on the environment

Based off project research, post-harvest hot water treatments showed to be the more effective disease control measure than fungicides used when spraying.

It is recommended that Australian papaya producers consider the potential benefits of installing and using a hot water system during seasons when crops are most vulnerable to disease.

Minimising the problem of post-harvest diseases starts in the field. Look to include a good spray program with well-set equipment followed by field hygiene and good post-harvest treatments.

Download the final report via: <https://www.horticulture.com.au/growers/help-your-business-grow/research-reports-publications-fact-sheets-and-more/pp13000/>

UPDATE

Issued to Hort Innovation and in force from 12 February 2020 to 28 February 2021, is APVMA issued ‘Permit for control of anthracnose and stem end rot in papaya’.

Access the new minor use permit here: <https://www.horticulture.com.au/contentassets/7e7ffa5152f04d9caf4fc1df3f4d0ff3/per89170.pdf>

The ‘Effect of curative and productive pre-harvest fungicide and postharvest hot water applications on decay of papaya’ (PP13000) is funded by Hort Innovation using papaya industry levies and funds from the Australian Government.

Hort Innovation
Strategic Levy Investment

PAPAYA FUND

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

PAPAYA BREEDING PROGRAM UPDATE: Flavour analysis seeks to improve eating quality

DR CHAT KANCHANA-UDOMKAN

Flavour is a complex trait that includes both taste perception in the mouth and aroma.

Understanding how papaya flavour can improve eating quality and drive future marketability and profitability for the Australian papaya industry has become a key target for a Hort Innovation papaya levy funded project.

The 'National papaya breeding and evaluation program' (PP18000), run by a project team at Griffith University, is working to characterise in-depth the key flavour type preferences within the whole papaya chain and to develop a library of chemical fingerprints that will be used as a tool to differentiate flavour types.

PROFESSIONAL PANEL TESTING

To determine flavour types of papaya, the project team evaluated 25 fruit samples including RB1, RB4, Skybury, 1B, H13 and advanced breeding line – Sunshine, from across the Dimbulah, Mareeba and Innisfail regions.

Samples were collected over two harvest seasons in spring 2019 and summer 2020, and were assessed for aroma, texture, flavour and aftertaste attributes by 11 trained panellists. In addition, they were also tested for sugar composition, Brix and volatile compounds.

As anticipated, spring fruit harvested in September 2019 showed lower sugar content and Brix than the January 2020 fruit samples, with the mean value of Brix in spring and summer fruit being 9.7 and 11.8, respectively. The same trend was observed in aroma and flavour intensity and aftertaste attributes. However, sweet fruit aroma was the only attribute that



Papaya panel testing at project reference group meeting at South Johnstone Research station in February 2020.

presented at a higher level in spring than summer fruit.

From these sensory test results, the project team could differentiate commercial varieties into two groups. **Group 1**, consisting of RB1 and Skybury, is red papaya with key descriptors of low aroma intensity and subtle musty and fishy aromas, but an overall high flavour intensity with dominating sweet caramelised and floral flavours and a sweet aftertaste. The flesh texture for RB1 on Tableland fruit showed to be typically resistant and velvety, whereas Skybury and RB1 grown on the coastal region were rated highly for juiciness and flavour intensity.

Fruit in **Group 2** however, included RB4, 1B and H13 and was described as having a strong aroma intensity with high citrus and sweet fruit aromas. The fruit in this

group was identified as more fibrous with strong musty and bitter flavours and very bitter aftertaste.

ADVANCED BREEDING LINES – SUNSHINE

Three advanced breeding lines of red papaya, Sunshine-4, Sunshine-5 and Sunshine-6, were then tested for flavour description. Sunshine-4 typically presents as more resistant and firmer in texture, and is the most velvety and least fibrous of the lines. Advanced breeding line, Sunshine-5, is also more resistant in texture and velvety, scoring high for resistance but the lowest for dissolving texture. Sunshine-6 however, typically scores high for floral and sweet caramelised flavour and aftertaste, and for dissolving, juiciness and flavour intensity. All three of these advanced breeding lines presented in **Group 1**.



PhD student, Ziwei Zhou, quantifying papaya samples for determination of volatile compound.

VOLATILE COMPOUNDS

Through analysis and correlation of results, the project team were able to detect 54 volatile compounds in eight samples of spring 2019 fruit, including RB1, RB4, 1B H13 and Skybury. Common chemicals across all the samples were Linalool and trans-Linalool oxide, which produces *citrus, floral, sweet rose, woody green, blueberry and floral* aromas.

Varying in samples between farms was RB1, consisting of 41 volatiles. Further, only six compounds were detected in Skybury papaya. Future research will investigate compounds specific to different varieties for aroma ratio and links to key flavour descriptions, seeking to identify key genes and molecular markers controlling flavour pathways in RB1 and 1B to further assist with breeding selection in the future.

Following further investigation, the project team will work to select and stabilise breeding lines to obtain varieties that will thrive and support continued growth of the industry. Before the new varieties are released, they will be assessed for all agronomic and fruit quality traits, as well as flavour and aroma.

The 'National papaya breeding and evaluation program' (PP18000) is expected to conclude in August 2023. 

**Hort
Innovation**
Strategic levy investment

**PAPAYA
FUND**

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

PAPAYA CLEAN SEED UPDATE

DR PAUL CAMPBELL

Delivered by research provider, Department of Agriculture and Fisheries Queensland (QDAF), the 'Papaya clean seed program' (PP18001) is working to better protect the papaya industry from papaya sticky disease by delivering a clean seed protocol.

Lead researcher, Dr Paul Campbell, has provided the following update on the virus transmission studies conducted to test virus free plants.

The production of parent lines free of the virus that causes papaya sticky disease continues to move forward, with the plants of seven parent lines being tested under the embryo rescue system and over 200 virus free plants currently in an insect proof screen house.

The numbers of infected plants continue to be low, with only five plants testing positive for the virus from the embryo rescue material. These materials are currently being established in tissue culture to assess long-term maintenance of the virus free lines.

It's vital that we undergo this monitoring and testing for the creation of lines for the seed industry into the future. Currently, the project team are working with Papaya Seeds Australia to

move some of the virus free plants into the field to establish reinfection rates.

The plants will be monitored for the presence of the virus over the next year to see how quickly they get infected by the virus, which will provide information vital to developing the management plan of parental lines to ensure virus free seed for industry.

With access to virus free material, the project team have begun working on characterising the virus to better understand how it is spread and how soon it can be detected post-infection. None of this basic knowledge is presently available and will be critical for future management decisions. 

The 'Papaya clean seed program' (PP18001) is funded by Hort Innovation using papaya industry levies and funds from the Australian Government.

**Hort
Innovation**
Strategic levy investment

**PAPAYA
FUND**

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FROM THE HORT INNOVATION OFFICE

WITH PAUL LILWALL, INDUSTRY STRATEGIC PARTNER, HORT INNOVATION

In February, Paul joined Hort Innovation as the Industry Strategic Partner for the tropical fruit cluster. Paul holds a Master of Business Administration (Strategic Management) and a Graduate Diploma in Project Management (Property Development) from Queensland University of Technology and an undergraduate degree in business from the University of Queensland.

Paul has spent the majority of his career working in both the public and private sectors, holding numerous

commercial roles, specialising in stakeholder engagement in regional Queensland with the primary resources and mining sectors via large linear infrastructure projects.

Paul is passionate about working hard in establishing, developing and building robust, honest and trusted relationships and delivering value to growers and industry. He aspires to become a trusted advisor for all growers, industry stakeholders and service providers within Hort Innovation's tropical fruit cluster. 

REGIONAL ROUND-UP

TULLY, QLD – Tayla Mackay

In early February, high temperatures of over 40 degrees created a number of challenges which affected red papaya production in the Tully Valley. This resulted in small columns of fruit and quality issues, predominantly with breakdown and brown spot, as well as increased quantities of smaller sized fruit.

We're looking forward to harvesting last year's plant in the coming months, which has a larger column due to the mild rainfall in week 15 that saw the Tully area benefit from 125mm of rain.

Some early plant has gone into the ground this year with mixed results. The second round of plant is looking exceptionally good. We anticipate fruit quality and size will improve coming into the winter months. 

INNISFAIL, QLD – Joe Zappala

The Wet Tropics experienced a below average wet season but got enough rain at the right time. Planting is in full swing and new blocks are coming into production.

COVID-19 is having an impact in the market place with demand falling as well as prices. We don't know where this will end up but there are challenging times ahead. 

TABLELANDS, QLD – Gerard Kath

The Tablelands is continuing on a similar growth pattern to the last 12 months.

Since the last report in November, total production would be slightly increasing. The main plantings are still in red varieties with a small number of yellow lines in Mareeba and Dimbulah. It is well known in the industry that profitability has not been good, so there has been some shift to other crops such as limes and avocados.

We have experienced below average rainfall with the first rain coming in mid to end January and the wet season finishing in mid-March, seeing less than 2 months rainfall. September to November saw fairly extreme temperatures, with cool to cold nights and hot dry days. This period resulted in a greater degree of carpeloid or cat face fruit in the reds. The conditions lately have been very favourable for good tree growth and fruit production.

Lately, we've seen an increase in fruit spotting bugs (FSB) and red spider mites. This would be likely due to the favourable growing conditions of late. As is the case normally, when FSB are sprayed then a short time later spider mites raise their numbers. Misting machines work for the normal control of black spot as well as the above-

mentioned pests.

We have lately also experienced a major problem in the yellow fruit (1b variety). The production per tree is great and the fruit size and appearance is excellent, yet we have a major problem with how the fruit cuts and eats. We have a large percentage of fruit that is very soft or jelly like with hard lumps or strands throughout the flesh. We have gone back to explain certain theories, yet nothing is 100% conclusive. Another example of how challenging this crop can be to grow consistently. 

CARNARVON, WA – Annie Van Blommestein

The horticultural industry has seen a rapid change in consumer habits and reduced demand from the service sector during these unusual times. This has led to a reduction in the market opportunity for seconds products.

Apart from the change in demand, production in Carnarvon has mostly been business as usual with the area under pawpaw production remaining stable. The weather has been perfect, wind has eased and we have had a number of magnificent river flows which has recharged the aquifer nicely. 

WANT TO SUBMIT AN UPDATE FROM YOUR GROWING REGION?

Email Industry Strategic Partner Paul Lilwall: Paul.Lilwall@horticulture.com.au

Communications grower survey

COMING
SOON



The final grower survey for the 2017-20 'Australian papaya industry communication program' (PP16001) will hit your inboxes next month.

This survey will include questions on the content in the Papaya Press and seek your views on the levy and levy funded R&D projects. We're also keen to know if you've adopted any

of the research findings to help grow your business.

Check your emails this June for the annual grower survey – it will only take a few minutes!

This will be the last one for the current communications program and we'd love to get your insights. 

Minor use permits for the papaya industry

There remains a need for the strategic use of specific pesticides and other chemicals in the papaya industry.

Through the Hort Innovation Papaya Fund's 'Papaya industry minor use

program' (PP16000), levy funds and Australian Government contributions are used to submit renewals and applications for minor use permits to the Australian Pesticides and Veterinary Medicines Authority (APVMA), as required.

All current permits are listed in the table below. Before use, it is recommended that you confirm the details of the permits through the APVMA website at:

<https://portal.apvma.gov.au/permits> 

Current permits: Minor use permits current as of 14 April 2020.

Permit ID	Description (chemical / crop / pest or use)	Original date of issue	Expiry date	Permit holder
PER12592 Version 2	Chlorothalonil and difenoconazole / Papaya / Black spot and brown spot	14-Aug-11	30-Apr-25	Hort Innovation
PER13076 Version 2	Propamocarb / Papaw or Papaya (seedlings) / Damping off <i>Please note: Permit to label pending</i>	05-Apr-12	31-Mar-22	Papaya Australia C/Hort Innovation
PER87164 Version 2	Dimethoate / Specified citrus and tropical and subtropical inedible peel fruit commodities – post-harvest dip or flood spray / Various fruit fly species	1-Mar-19	31-Mar-24	Hort Innovation
PER13671 Version 3	Beta-cyfluthrin (Bulldock 25 EC) / Papaya / Fruit-spotting bug and banana-spotting bug	28-Nov-12	28-Feb-23	Papaya Australia C/Hort Innovation
PER14098 Version 2	Etoxazole (Paramite Selective Miticide) / Papaya / Two-spotted mite	3-Oct-13	30-Jun-23	Papaya Australia
PER14097 Version 3	Abamectin and fenbutatin oxide / Papaya / Two-spotted mite	31-Oct-13	30-Jun-23	Papaya Australia
PER12450 Version 6	Trichlorfon / Specified fruit crops / Fruit fly	06-Oct-11	31-Jan-21	Growcom
PER14417 Version 2	Copper as hydroxide / Papaya / Papaya fruit rot (Phytophthora)	28-Feb-14	31-Dec-24	Hort Innovation
PER14490 Version 2	Metalaxyl-M (Ridomil Gold), Metalaxyl (Zee-mil) + Phosphorous acid / Papaya / Phytophthora root rot and pythium	4-Apr-14	31-Mar-22	Papaya Australia C/Hort Innovation
PER13859	Dimethoate / Orchard clean-up – fruit fly host crops following harvest / Fruit fly	9-Feb-15	31-Jul-24	Growcom
PER80746	Ethephon / Papaya / Fruit de-greening	18-Aug-15	31-Aug-20	Papaya Australia
PER85397	Sulfoxaflor (Transform) / Lychee, mango, papaya and passionfruit (field grown) / Fruit-spotting bug and banana-spotting bug	17-Apr-18	30-Apr-23	Hort Innovation
PER89170	Fludioxonil (Scholar fungicide) / Papaya / Anthracnose and stem end rot (post-harvest dip or overhead treatment) <i>Please note: This is an emergency use permit.</i>	12-Feb-20	28-Feb-21	Hort Innovation
PER89241	Spinetoram / Tropical inedible peel / Fall armyworm	6-Mar-20	31-Mar-23	Hort Innovation

Minor use permit updates are circulated in Hort Innovation's *Growing Innovation* eNewsletter. Sign up for updates at: www.horticulture.com.au/sign-up.

Read more on the minor use permits for the papaya industry at: horticulture.com.au/growers/help-your-business-grow/research-reports-publications-fact-sheets-and-more/minor-use-permits-for-the-papaya-industry/

HORT INNOVATION UPDATES

NEW Australian Horticulture Statistics Handbook released

Australia's papaya industry can now access the latest industry data with the release of the Australian Horticulture Statistics Handbook 2018/19 (HA18002).

Released by Hort Innovation, the Handbook draws data from several supply chain and trade resources to produce statistics on 75 horticultural categories.



Total fresh horticulture exports were valued at \$2.64 billion in 2018/19, 27 per cent higher than the previous year.

For the year ending June 2019, 2.79 million tonnes of fruit were produced in Australia, valued at \$5.5 billion. Fresh fruit exports had increased from the previous year by 23 per cent, now valued at \$1.3 billion.

This is the fifth time the Handbook has been produced, enabling statistics to be compared which is resulting in the identification of key insights. One of those insights has been that the success of the fresh export market in recent years has shown that business growth is now enabled by access to these markets.

The Handbook is available on the Hort Innovation website at: horticulture.com.au

The Australian Horticulture Statistics Handbook 2018/19 (HA18002) has been funded by Horticulture Innovation Australia Limited using the across industry levy and funds from the Australian Government.

AT A GLANCE: PAPAYA/PAWPAW 2018/19 STATISTICS

- 14,921 tonnes of red papaya and yellow pawpaw was produced
- Farm gate value was \$27.5 million while the wholesale value of fresh supply was \$32.3 million
- The supply per capita was 584 g based on the volume supplied
- Australia imported 40 tonnes of fresh red papaya and yellow pawpaw. These imports came from Fiji (39t) and Thailand (1t)
- Australia exported 45 tonnes of fresh fruit, with the majority coming from Queensland (42t)
- Red papaya accounted for 65% of fresh production, and yellow pawpaw accounted for 35%
- New Zealand is the main market for exported fresh red papaya and yellow pawpaw, taking 99% of Australia's produce

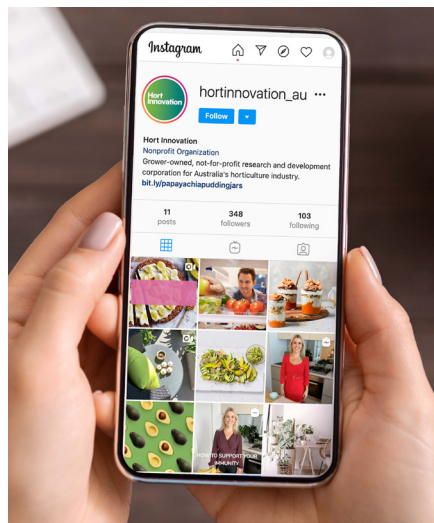
COVID-19 Information

Hort Innovation have established a COVID-19 information hub, where growers and wider industry can go to access news updates and information relating to continued operation. You can access this at: horticulture.com.au/growers/covid.

The Harvest to Home website has been updated to include preliminary information on the impacts of COVID-19 on fresh produce. Access these updates at: harvesttohome.net.au.

NEW Hort Innovation Instagram account

Hort Innovation has a new Instagram account. Get the latest updates and tag them in posts you want to see on the page via [@hortinnovation_au](https://www.instagram.com/hortinnovation_au)



NEW LEVY FUNDED PROJECT

A new multi-industry levy funded project, 'Biosecurity plan for the lychee, papaya and passionfruit industries' (MT18006), seeks to review and combine biosecurity plans for the lychee, papaya and passionfruit industries. Led by Plant Health Australia, the plan will identify high-priority endemic and exotic pests, diseases and weeds, and the risk mitigation, surveillance and diagnostic activities required to reduce their threat. This plan will provide a strategic framework for industry and government to improve preparedness and response to potential threats.

Expected completion date: 14 November 2024

The 'Biosecurity plan for the lychee, papaya and passionfruit industries' (MT18006) project is funded using papaya, lychee and passionfruit levies and funds from the Australian Government.

Hort Innovation
Strategic levy investment

PAPAYA FUND

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

PAPAYA PRESS

ISSUE 6 - NOVEMBER 2020

Papaya clean seed update

DR PAUL CAMPBELL

The 'Papaya clean seed program' (PP18001), delivered by the Department of Agriculture and Fisheries Queensland (QDAF), is working to better protect the papaya industry from papaya sticky disease by delivering a clean seed protocol.

Testing for the final three parent lines from Papaya Seeds Australia have recently been initiated through the embryo rescue program to clean up the papaya meleira virus. Though it will be a while before they are large enough to test for the virus.



The first clean parental material on the Tablelands.
Photo credit: Dr Chat Kanchana-udomkan

Similar to results from the first two parent lines, the project team hope to see very low numbers of infected plants after the embryo rescue. So far, they've identified only five infected plants from the embryo rescued material, with most plants having been tested several times.

The project team have been working with Papaya Seeds Australia to move virus free plants into the field to establish reinfection rates and monitor for the presence of the virus. This is critical in the development of a management plan for parental lines to ensure virus free seed for industry.

Clean plants from the previous seven parent lines have all been established in tissue culture to safeguard industry's investment towards clean seed. Over eighty plants from six parental lines have been planted in the field at both the Tablelands and on the coast.

Plants are being regularly sampled and tested for papaya meleira virus, to evaluate virus movement in the field. The speed of the reinfection will have a large impact on the management of the parent material to produce clean seed moving forward.

The project team at QDAF have also been working on developing a new type of test to support the virus

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diagnostics. This new test seeks to identify if a plant is infected within 45 minutes directly from a drop of latex from the fruit. No special equipment will be required, the reaction will just need to be kept at a constant 65°C.

In the future this kind of test could be used directly by industry to check on the infection of the plants. Further work is being done to explore the availability of tests to diagnose infection directly from a small amount of leaf tissue.

The 'Papaya clean seed program' (PP18001) is funded by Hort Innovation using papaya industry levies and funds from the Australian Government.

Hort Innovation
Strategic levy investment

PAPAYA FUND

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This magazine is funded by Hort Innovation using the papaya R&D levy and contributions from the Australian Government.

Hort Innovation is the grower-owned, not-for-profit research and development corporation for Australian horticulture.

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**Hort
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Strategic levy investment

**PAPAYA
FUND**

See your levy at work!

Get an update on all new, current and recently completed levy funded activity on the Hort Innovation Papaya Fund page at www.horticulture.com.au/papaya.

You can access easy-to-read project updates, a snapshot of the Papaya Fund, research reports and resources, key industry contacts and more. Don't miss the Hort Innovation 'Growers' section to keep informed on your levy investments, upcoming events, scholarship opportunities and other handy info!

Stay in the loop with your levy by becoming a member of Hort Innovation, the grower-owned, not-for-profit research and development corporation for Australian horticulture. Paying a levy doesn't automatically make you a member but signing up is free at www.horticulture.com.au/membership.

From the Chair

GERARD KATH

Welcome to the November edition of the Papaya Press.



Though it has been a challenging year for everyone, I do believe that the papaya industry has fared ok amidst the pandemic in terms of negative market impacts. We've been quite fortunate compared to other industries.

During the early stages of COVID-19 in March and April this year, we weren't sure of the impact that the economy and consumer ramifications would have on our industry. But it has been really positive to see fresh fruit and vegetables remain top-of-mind, as consumers prioritised health and cooking more at home.

We're seeing and anticipating great yields for the remainder of the year, with the wholesale price of papaya also on the rise. This is surprising, as we generally see a downturn in price when yields are high.

It's great to see strong demand for papaya fruit, with the current harvested fruit cutting and eating really well.

I hope to see consumer demand continue as we lead into Christmas.

As I'm sure you're aware, over the next few months and as we head into 2021, we are expecting possible labour shortage issues. This will have a particularly significant impact on short season fruit industries such as mangoes and lychees, who need lots of short-term workers as summer fruit comes on.

The papaya workforce is generally quite consistent work, so we haven't seen a large impact yet and I don't expect we will.

From a Hort Innovation perspective, Ben Woodman remains on to advise and manage the marketing budget, with Georgia Sheil being our primary Industry Strategic Partner (ISP).

There has been no Strategic Investment Advisory Panel (SIAP) meeting scheduled but keep an eye out for more information on this to come. We look forward to outlining and sharing a new plan and information moving forward.

As we lead into the Christmas period, I wish everyone a safe and productive rest of the season and a happy New Year.

Best regards,
Gerard Kath

2020 GROWER COMMUNICATIONS SURVEY

The final annual grower survey under the current 'Australian papaya industry communications program' (PP16001), was carried out in June to July this year.

This survey aims to give levy payers the opportunity to provide feedback and influence the future direction of the program so that they continue to receive the information that want, and need, from levy-funded research & development and marketing projects.

Ten survey questions were developed to gain feedback on the latest edition of the Papaya Press, the 'For Growers' webpage, as well as determine understanding of the levy and content preferences.

Thank you to the 11 papaya growers who participated in this year's survey – your insights and feedback are much appreciated.

KEY SURVEY INSIGHTS

- On average, respondents rated the May 2020 Papaya Press 8.55 out of 10.
- Eight of the respondents thought there was enough information on the R&D levy.
- Seven out of the 11 respondents said they had accessed the 'For Growers' page since receiving the May 2020 Papaya Press.
- Nine respondents identified climate as a top concern for their business, and seven said pest and disease.
- Seven respondents said they would like more content on R&D outcomes and fact sheets or project summaries.

MARKETING AND SOCIAL MEDIA UPDATE

During the COVID-19 pandemic, consumers continued to show an increased interest in home cooking as well as their health.

Through marketing activity, Papaya Australia has continued to offer positive influence for all home cooks by providing general meal ideas and promoting the health benefits of papaya fruit.

PUBLIC RELATIONS CAMPAIGN

To support the spring flush, the marketing team develop two seasonal press releases to remind consumers of the availability and benefits of papaya. A big part of gaining coverage around these releases is by sharing new papaya-inspired recipes with media.

There is currently one media release out, which has garnered 41 pieces of coverage across print, online, social, and direct mail. One of these was in the MiNFOOD print clipping shown.

The next piece of media activity will focus on the release of the papaya health report, which builds on current consumer interests in health and immunity, to increase the number of



consumers choosing papaya fruit as part of a healthy diet. This includes updated nutritional information, recipes, trends, and other relevant consumer information.

Access a copy of the papaya health report, at: australianpapaya.com.au/about/nutrition

SOCIAL MEDIA

The Papaya Australia social media activity continues to attract and engage consumers with their regular postings across Facebook and Instagram.

The sentiment for papaya channels continues to be positive, with fans regularly engaging and sharing how they utilise the fruit and commonly asking about variety and selection.

For the spring social campaign across September to 23 October, the papaya Facebook channel had achieved 70% of the target KPI on impression, and 55% of target impressions on Instagram.

Instagram stories are a great way to engage a younger audience and have been performing well in capturing attention out of social news feeds.

Having a strong social media presence is an important way to interact with consumers as well as provide inspiring content for a healthy lifestyle.

As shared in the Papaya Fund 2019/20 Annual Report, grower content appealed greatly to fans and when accompanied with a seasonal update it garnered high engagement and reach on the page.

PAPAYA GROWERS – WE NEED YOU!

To keep driving demand for Australian papaya and to help connect consumers with papaya's farm-to-table journey, the papaya marketing team are calling for the nation's growers to submit video and imagery content that shares a personal insight into farming.

Content provided will be posted on Papaya Australia's social media channels (Facebook and Instagram) with credit provided to the producer.

The content doesn't need to be too professional, good quality phone photos are great! Send your photos to isabelle@bitecom.com.au to be featured and help encourage consumers to eat more Australian papaya.

Find some content examples and ideas on the Papaya Australia Instagram account, [@papayaaustralia](https://www.instagram.com/papayaaustralia)

UPDATE ON PAPAYA BREEDING PROGRAM

DR CHAT KANCHANA-UDOMKAN AND ZIWEI ZHOU, GRIFFITH UNIVERSITY

Creating new papaya varieties with improved eating quality to drive future marketability and profitability for the Australian papaya industry has become a key target for a Hort Innovation papaya levy funded project.

The 'National papaya breeding and evaluation program' (PP18000), run by a project team at Griffith University, is working to characterise in-depth the key flavour type preferences within the whole papaya chain and to develop a library of chemical fingerprints that will be used as a tool to differentiate flavour types.

The project team have worked to select and stabilise new breeding lines to obtain varieties that will thrive and support continued growth of the industry.

At present, generation 5 (F5) for both red papaya and yellow papaw has been achieved, with a target to produce F7 by 2022 and additional hybrid varieties by 2023.

The new genetic stable lines that suit each growing climate will be used

to create new F1 hybrid varieties for the industry.

The selected advanced breeding lines have been evaluated based on all agronomic and fruit quality traits, as well as flavour and aroma.

The key traits of new breeding lines are fruit set lower to the ground for ease of harvest, cylindrical fruit shape for the efficiency of packing, high Brix level to suit the demand of the market and consumer, and comparable yield to the standard commercial varieties (RB1 or 1B).

The weighted selection index was developed and implemented in the selection process in a total of four trial sites on the Tablelands and Innisfail.

The project team has also uncovered flavour-associated genes between RB1 (sweet caramelised and sweet aftertaste flavour) and 1B (strong aroma intensity with citrus aroma) at different fruit maturity stages using RNA sequencing technology. A total of 230,859 RNA sequences (transcripts) were detected among all samples.

Interestingly, the team discovered that

some genes are up-regulated in ripe fruit but down-regulated in the unripe ones. However, there are many genes differentially expressed in samples analysed and some may not relate to the trait of interest, so they need to be narrowed down by searching against the database.

The identified genes associated with key flavour and aroma attributes: sugar; acid; and chemical compounds, will be developed further to help with the selection in the breeding program in the future.

The 'National papaya breeding and evaluation program' (PP18000) is expected to conclude in August 2023.

For more information, please contact Dr Chat Kanchana-udomkan, c.kanchana-udomkan@griffith.edu.au.

The 'National papaya breeding and evaluation program' (PP18000) project is funded by Hort Innovation using papaya industry levies and funds from the Australian Government.

Hort Innovation
Strategic levy investment

PAPAYA FUND

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Figure: comparison between advanced breeding line (F5) and commercial variety (RB1)

New papaya pollination brochure

In July 2020, a Papaya pollination brochure was released as part of the Hort Innovation funded, ‘Strengthening and enabling effective pollination for Australia’ (PH15000) project. The brochure summarises current best practice for pollination management, and new and ongoing research on the topic.

Delivered by research provider Plant & Food Research, this project is a Hort Frontiers Pollination Fund investment, seeking to achieve more sustainable pollination services for Australian crops by improving the understanding of pollination requirements.

The Papaya pollination brochure equips growers with information they need to maximise yields of papaya crops through better pollination, including a checklist for developing an orchard pollination plan.

As outlined in the brochure, here’s what you need to know:

- Papaya and pawpaw pollination depends on the cultivar.
- Orchards with separate male and female trees need male plants inter-planted among female plants to ensure enough pollen is available.
- Papaya and pawpaw pollen can be moved by wind, but generally not enough to ensure pollination.
- For plantings with male and female plants, hawk moths are probably the most important pollinators.
- Hawk moths depend on particular native host plants for their development.

- The role of honey and stingless bees in strengthening pollination for mixed sex flowers of papaya is not fully understood.
- Weather extremes and plant management can affect pollen viability.

Find out more and download your copy of the Papaya pollination brochure, here: horticulture.com.au/globalassets/hort-innovation/resource-assets/ph15000-papaya-pollination-brochure.pdf



Brian Cutting, Plant & Food Research Australia

The ‘Strengthening and enabling effective pollination for Australia’ (PH15000) project is funded by Hort Frontiers Pollination Fund; part of the Hort Frontiers strategic partnership initiative developed by Hort Innovation and Plant & Food Research.

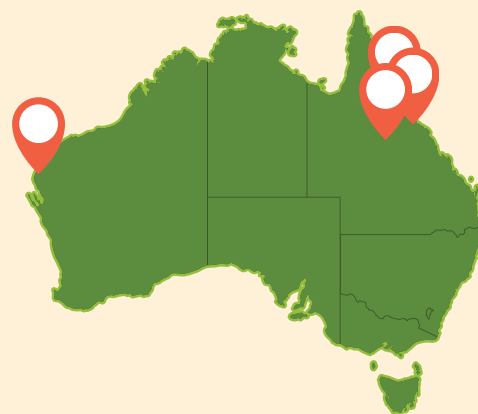


**POLLINATION
FUND**



Lisa Evans, Plant & Food Research

REGIONAL ROUND-UP



INNISFAIL, QLD – JOE ZAPPALA

Production in the last month has increased as weather conditions have warmed up. Fruit quality from the coastal areas is high with production remaining high as we head into the new year.

Spring plantings in the wet tropics are well underway. High production from all growing areas has flooded the market, with the prices back to the growers falling to below cost of production.

Competition from mangoes and summer fruits has added to the fall in prices. Predictions of a La Nina has growers looking to the next few months with a stronger wet season and more cyclones. This has growers on edge as we can tolerate a bigger wet season, but a cyclone would be catastrophic.

TULLY, QLD – TAYLA MACKAY

Weather in the area is starting to warm up heading into summer, with the heat bringing with it some showers and the potential for storms and severe weather beginning to form. Extreme weather events are always a threat to farming in North Queensland, particularly in summer.

Winter freckle this season has not been as prominent with above average temperatures experienced in the Tully region. What is remaining of the winter freckle will soon disappear in the next few weeks.

Sugar levels in papaya will start to increase in the coming weeks, and customers can expect a sweeter tasting fruit through summer! Crop growth is also accelerating with the help of warmer and longer days, increasing fruit harvest numbers significantly, compared to winter months.

CARNARVON, WA – ANNIE VAN BLOMMESTEIN

Weather conditions in Carnarvon have been perfect for crop production over the last few months. Plantings in Carnarvon have remained unchanged and supply from the district is steady.

As we approach the warmer weather and peak supply of our many fruit crop lines, like other districts, we are faced with low available labour numbers. In a year such as this, the importance of a local workforce is highlighted. We need to attract more of our children to consider careers in the primary industries, let's spread the word of the opportunities that the primary industries sector presents!

TABLELANDS, QLD – GERARD KATH

Papaya production on the Tablelands continues at a steady pace. In the last 6 months, there has been no major weather events that have greatly affected production. There was the one week in July that experienced low and some minus temperatures. There was also some reported frost damage, however this hasn't impacted main production.

The September and October months have been at record or close to record production, with most fruit being of sound quality with good feedback on eating quality. We're likely to see a large volume of fruit continue through November and early December.

The last month has been typical hot and very dry conditions. This will likely have some bearing on fruit set which will impact the February to March harvest. There is currently no rain or storms on the horizon.

The general feel is that investment in new plantings is continuing at similar levels to last year, with no major change to grower numbers or size. As always, production will be mainly determined by major weather events.

WANT TO SUBMIT AN UPDATE FROM YOUR GROWING REGION?

Email Industry Strategic Partner, Georgia Sheil: georgia.sheil@horticulture.com.au

Minor use permits for the papaya industry

The Hort Innovation Papaya Fund's 'Papaya industry minor use program' (PP16000), supports the submission of applications for new and renewed minor use permits for the industry, as well as data generation activities to support chemical permits and registrations, and strategic

agrichemical reviews.

All current permits are listed in the table below. Before use, it is recommended that you confirm the details of the permits through the APVMA website at: <https://portal.apvma.gov.au/permits>.

Get the latest information on minor use permits in this extract from the Hort Innovation Papaya Fund 2019/20 Annual Report. You can access the full document at: <https://www.horticulture.com.au/hort-innovation/funding-consultation-and-investing/investment-documents/fund-annual-reports/>

CURRENT PERMITS: MINOR USE PERMITS CURRENT AS OF 21 SEPTEMBER 2020.

Permit ID	Description (chemical / crop / pest or use)	Original date of issue	Expiry date	Permit holder
PER12592 Version 2	Chlorothalonil and difenoconazole / Papaya / Black spot and brown spot	14-Aug-11	30-Apr-25	Hort Innovation
PER13076 Version 2	Propamocarb / Papaw or papaya (seedlings) / Damping off	05-Apr-12	31-Mar-22	Papaya Australia C/Hort Innovation
PER87164 Version 2	Dimethoate / Specified citrus and tropical and sub-tropical inedible peel fruit commodities – post-harvest dip or flood spray / Various fruit fly species	01-Mar-19	31-Mar-24	Hort Innovation
PER13671 Version 3	Beta-cyfluthrin (Bulldock 25 EC) / Papaya / Fruit-spotting bug and banana-spotting bug	28-Nov-12	28-Feb-23	Papaya Australia C/Hort Innovation
PER14098 Version 2	Etoxazole (Paramite Selective Miticide) / Papaya / Two-spotted mite	03-Oct-13	30-Jun-23	Papaya Australia
PER14097 Version 3	Abamectin and fenbutatin oxide / Papaya / Two-spotted mite <i>Please note: Abamectin use now registered on various labels</i>	31-Oct-13	30-Jun-23	Papaya Australia
PER12450 Version 6	Trichlorfon / Specified fruit crops / Fruit fly	06-Oct-11	31-Jan-21	Growcom
PER14417 Version 2	Copper as hydroxide / Papaya / Papaya fruit rot (Phytophthora)	28-Feb-14	31-Dec-24	Hort Innovation
PER14490 Version 2	Metalaxyl-M (Ridomil Gold), metalaxyl (Zee-mil) + phosphorous acid / Papaya / Phytophthora root rot and pythium	04-Apr-14	31-Mar-22	Papaya Australia C/Hort Innovation
PER13859	Dimethoate / Orchard clean-up – fruit fly host crops following harvest / Fruit fly	09-Feb-15	31-Jul-24	Growcom
PER80746 Version 2	Ethephon / Papaya / Fruit de-greening	18-Aug-15	31-Aug-25	Hort Innovation
PER85397	Sulfoxaflor (Transform) / Lychee, mango, papaya, and passionfruit (field grown) / Fruit-spotting bug and banana-spotting bug	17-Apr-18	30-Apr-23	Hort Innovation
Emergency use permit PER89170	Fludioxonil (Scholar Fungicide) / Papaya / Anthracnose and stem end rot (post-harvest dip or overhead treatment)	12-Feb-20	28-Feb-21	Hort Innovation
PER89241	Spinetoram / Tropical inedible peel / Fall armyworm	06-Mar-20	31-Mar-23	Hort Innovation
PER89870	Spinosad (Entrust organic) / Various including tropical and sub-tropical fruit crops (inedible peel) / Fall armyworm	21-Jul-20	31-Jul-23	Hort Innovation

All efforts have been made to provide the most current, complete and accurate information on these permits, however you should always confirm all details on the APVMA website at portal.apvma.gov.au/permits. Details of the conditions of use associated with these permits can also be found on the APVMA site.

Minor use permit updates are circulated in Hort Innovation's *Growing Innovation* eNewsletter. Sign up for updates at: www.horticulture.com.au/sign-up.

HORT INNOVATION UPDATES

PAPAYA FUND ANNUAL REPORT RELEASED

Hort Innovation has recently released the 2019/20 Papaya Fund Annual Report. Be sure to check it out for all the latest insights on industry levies and activities for 2019/20.

While some activities were impacted by COVID-19, there continued to be a solid stream of investment across the 2019/20 financial year for the Papaya Fund. This included the delivery of the *Maximising pollination in papaya orchards guide*, the new sensory work to support the development of premium papaya varieties and more.

AT A GLANCE: 2019/20 PAPAYA FUND

- \$225,000 invested in R&D
- \$108,000 invested in marketing
- 10 active R&D investments
- \$382,000 in levies collected

Over the past financial year, Hort Innovation continued to track investment expenditure and look towards new investments against the Papaya Strategic Investment Plan (SIP) 2017-21.

As the SIP is due for renewal in 2021, Hort Innovation will be undertaking a performance analysis to see how the industry has progressed against the current plan, which will be used to help guide future investment priorities.

In 2020/21 Hort Innovation will be implementing new ways of obtaining advice and setting priorities for industry investments. Growers – be sure to keep an eye out for these changes, to have your say and help drive greater outcomes for industry.

View the Papaya Fund annual report for the 2019/20 financial year, at: <https://www.horticulture.com.au/globalassets/hort-innovation/levy-fund-financial-and-management-documents/fund-annual-report-pdfs-201920/hort-innovation-annual-report-2019-20-papaya-fund.pdf>

You can also access Hort Innovation's Company Annual Report 2019/20, at: <https://www.horticulture.com.au/globalassets/hort-innovation/corporate-documents/hort-innovation-company-annual-report-2019-20.pdf>



THE GOOD MOOD FOOD: EAT FRESH, EAT AUSTRALIAN

It's no secret that COVID-19 has presented challenges across all areas of horticulture, impacting access to the export market, food service and the way consumers behave when purchasing and consuming papaya and pawpaw.

Acknowledging these pressures on the industry, Hort Innovation launched 'The Good Mood Food' campaign to support growers by promoting the benefits of eating good quality, fresh fruit, vegetables and nuts in that 'when you eat better, you feel better'.

Using television advertising, public relations, social media and a range of partnerships, the campaign has been able to focus on both season and occasion, showcasing the versatility of Australia's horticulture sector.

In July, 56 per cent of surveyed consumers said The Good Mood Food campaign had positively influenced their shopping habits, and by the end of campaign's run, 98 per cent of all Australians were expected to be reached.

Understanding that consumer behaviour has dramatically shifted, with price, quality and accessibility being a greater focus, the campaign highlighted the importance of provenance and support of locally grown produce but also how foods can boost one's mood and therefore overall health and wellbeing.

This would present an opportunity for the papaya marketing program, funded through industry marketing levies, to draw upon the message of The Good Mood Food campaign and access a platform for industry to explore ways to inspire Australians to reach for papaya this summer by highlighting the fruit's provenance and nutritional benefits.

You can find out more about The Good Mood Food campaign by visiting: <https://www.horticulture.com.au/the-good-mood-food/>

For more information, contact the Hort Innovation team at, thegoodmoodfood@horticulture.com.au