

## **Final Report**

# **Quality improvements in the melon supply chain**

**Project leader:**

Mark Loeffen

**Delivery partner:**

Delytics

**Project code:**

VM21001

**Project:**

Quality improvements in the melon supply chain (VM21001)

**Disclaimer:**

Horticulture Innovation Australia Limited (Hort Innovation) makes no representations and expressly disclaims all warranties (to the extent permitted by law) about the accuracy, completeness, or currency of information in this Final Report.

Users of this Final Report should take independent action to confirm any information in this Final Report before relying on that information in any way.

Reliance on any information provided by Hort Innovation is entirely at your own risk. Hort Innovation is not responsible for, and will not be liable for, any loss, damage, claim, expense, cost (including legal costs) or other liability arising in any way (including from Hort Innovation or any other person's negligence or otherwise) from your use or non-use of the Final Report or from reliance on information contained in the Final Report or that Hort Innovation provides to you by any other means.

**Funding statement:**

This project has been funded by Hort Innovation, using the melon research and development levy and contributions from the Australian Government. Hort Innovation is the grower-owned, not-for-profit research and development corporation for Australian horticulture.

**Publishing details:**

Published and distributed by: Hort Innovation

Level 7  
141 Walker Street  
North Sydney NSW 2060

Telephone: (02) 8295 2300

[www.horticulture.com.au](http://www.horticulture.com.au)

© Copyright 2024 Horticulture Innovation Australia Limited

## Contents

<b>Final report.....</b>	<b>1</b>
<b>Quality Improvements in the Melon supply chain .....</b>	<b>1</b>
Contents .....	3
Public summary.....	4
Keywords .....	4
Introduction.....	5
Methodology .....	5
Wholesale and retail maturity monitoring .....	5
Consumer taste panels.....	6
Melon quality improvement workshop.....	6
Grower roadshows .....	6
Results and discussion .....	7
Wholesale and retail maturity monitoring.....	7
Consumer taste panels.....	11
The influence of Brix variability on consumer acceptance.....	13
Melon quality improvement workshop.....	13
Outputs.....	15
Outcomes .....	17
Monitoring and evaluation.....	18
Recommendations.....	19
Refereed scientific publications.....	19
References .....	19
Intellectual property .....	19
Acknowledgements.....	19
Appendices .....	20

## Public summary

The strategic levy funded project Quality Improvements in the Melon Supply Chain (VM21001), led by Delytics, was designed to improve the eating quality of Australian melons by developing minimum quality standards for Seedless Watermelon, Rock Melon and Honeydew. Once adopted, the new standards will help the Australian melon industry consistently supply consumers with melons they enjoy eating, which will improve consumer acceptability and demand.

The project was initiated to overcome the challenges caused by poor quality fruit, which were hindering sales and growth in both domestic and export markets.

The Melon Consumer Insights report by Colmar Brunton (VM18000) in August 2019 reported that 26% of their participants had a negative eating experience with melons. The Nielsen Harvest to Home report for the year ending mid-June 2023 supported the need for change by reporting an 8% decrease in dollar sales for melons, and a 22% decline in the number of melons purchased –the highest decline in Australia’s top ten fruit.

Delytics was supported by project team members Melons Australia, Rudge Produce Systems and the Queensland Department of Agriculture and Fisheries (QDAF) Consumer Sensory team. The first phase of the project, started in July 2022, was to gather evidence to enable the industry to identify the fruit maturity available to consumers and decide what level of maturity standards would be needed to meet consumer taste expectations. Two sets of consumer taste panels helped the project team understand what maturity consumers enjoy eating. Maturity monitoring at both wholesale and retail allowed the team to benchmark the maturity of melons available to consumers and enabled the project team to analyse how changing seasons and weather patterns affected melon maturity.

The combined results of the maturity monitoring and taste panels provided the insights needed to enable the industry to decide what level of standards were needed.

The new maturity standards were set by stakeholders representing all facets of the Australian melon supply chain and endorsed by the Melons Australia Board. The industry agreed on a consumer acceptability target of 80%, and the following interim maturity standards were set to achieve that:

- Seedless Watermelon - a minimum standard of 80% fruit above 10° Brix, with the potential to consider a future standard of minimum 11° Brix.
- Rock Melon - a minimum standard of 50% fruit above 11° Brix.
- Honeydew - a minimum standard of 70% fruit above 11° Brix.

This project met Outcome 1, Strategy 5 of the Melon Strategic Investment Plan 2022-2026, to ‘Establish quality standards to improve consumer acceptance of Australian melons.’ The project will also contribute to increased repeat purchases and value for Australian melons once the standards are adopted by all supply chain participants.

## Keywords

Melons, watermelon, rock melon, honeydew, minimum maturity standards, consumer acceptability, Brix compliance.

## Introduction

The objective of this project was to develop minimum quality standards for Seedless Watermelon, Rock Melon and Honeydew that, once adopted, will enable the industry to supply consumers with consistently good tasting melons. Achieving this will encourage consumers to buy more melons, which will increase consumption and demand.

The project was initiated to overcome the long-standing issue of poor-quality melons hindering sales and growth in both domestic and export markets.

A 2019 report by Colmar Brunton (VM18000) entitled ‘Melon Consumer Insights’ revealed consumers were hesitant to purchase Australian melons due to inconsistent quality of produce, especially with respect to taste/flavour and texture/firmness. The report also reported that melon purchases were hindered by a consumer’s inability to judge quality easily. The report stated that consumers are less particular than retailers about the ‘look’ of a melon (e.g., stripes not important) and care more about taste than appearance. The report also revealed that although retailers prioritise shelf life, sweetness is more important to consumers, and that consumers find melon quality hard to judge, particularly for whole melons.

In 2020 an industry working group convened by Hort Innovation identified the need to lift melon quality across the whole supply chain.

The Nielsen Harvest to Home results to mid-June 2023 showed that dollar sales grew by almost 4 percent for all fruit. Of the top ten Australian fruit monitored by Nielsen, melons recorded the highest volume decline (-22.3%) with dollar sales down 8.1%. The number of melon-buying households dropped from 63.4% in 2021 to 56.3% in 2023, the annual amount purchased dropped from 13.0 kg to 10.3 kg and purchase frequency also decreased.

The development of minimum maturity standards is a key building block to improve the eating quality of Australian melons. The Australian table grape and citrus industries have seen significant improvements in produce quality and consumer acceptance. After developing industry quality standards in collaboration with retailers, Delytics led the table grape project TG17002 - Table grape supply chain quality 2017-2021 that developed the new table grape standards and provided the analyses that underpinned the Citrus Quality Standards. The Nielsen Harvest to Home results to mid-June 2023 showed that citrus was the number one fruit category in the top ten Australian fruit, with a 0.4% volume growth. For table grapes, the number two Australian fruit category, prices and the average annual spend per buyer were higher. The citrus and table grape industries show how consumers have responded after quality improvement projects have been adopted by their supply chains. These results show the significance of these projects for their respective industries and highlight the results anticipated for melons.

This project met Outcome 1, Strategy 5 of the Melon Strategic Investment Plan 2022-2026, to ‘Establish quality standards to improve consumer acceptance of Australian melons.’ The project will also contribute to increased repeat purchases and value for Australian melons as these standards will be adopted by all supply chain participants.

## Methodology

The project comprised four main activities:

- Wholesale and retail maturity monitoring to benchmark the maturity of melons available to consumers.
- Consumer taste panels to understand what maturity consumers enjoy eating.
- A melon supply chain workshop to agree on a set of minimum maturity standards that will help the industry consistently provide consumers with the eating quality they want.
- Participation in grower roadshows to socialise the project and its findings among growers.

### Wholesale and retail maturity monitoring

Rudge Produce Systems performed the wholesale and retail Melon Quality Assessments, which started in August 2022 and finished in January 2024. Seedless watermelon, rock melon and honeydew fruit were collected each fortnight from the wholesale markets and retail stores in Brisbane and Melbourne for the first year, and then also in Sydney from August 2023 to provide a greater geographic spread. The retail sampling included Aldi, Coles and Woolworths supermarkets plus some independent fruit stores. Some specialty melons were also sampled at the request of Melons Australia.

The fruit samples were taken to the Rudge facilities in each city for quality and maturity analyses. These analyses were undertaken based on the watermelon and rock melon quality guides published by the Queensland Government Department of Primary Industries and Fisheries (Barker & Ledger, 2007). For honeydew, the rock melon quality guide was used as the baseline and adapted as necessary. Each fruit was assessed for skin and flesh condition, then the Brix and firmness were measured as prescribed in the quality guides. Each fruit sample was also tasted.

The data collected from each fruit included skin and flesh condition as well as maturity. All the data was typically sent to Delytics on the day of measurement. Delytics used its in-house proprietary systems to process the data the same day it was received. The results of these analyses were published as a PowerPoint presentation, available to all growers through the Melons Australia website (<https://www.melonsaustralia.org.au/>). The new Melons Australia website was still being built at the start of this project and Melons Australia wanted these results to be available only to registered growers through their website and not to the media. The new Melons Australia web platform was launched on 14 April 2023 with a secure login-protected portal as a key feature. Every levy payer, grower and Strategic Partner of the melon industry was given a unique login to access the secure resources. Part of the secure platform provided the industry with live 24/7 access to the de-identified monitoring results.

The wholesale and retail maturity monitoring was originally planned to conclude at the end of July 2023. However, Melons Australia saw such value in the analyses that the monitoring was extended to the end of January 2024 to enable year-on-year comparisons to be made.

Brix was the key measure of interest for the wholesale and retail maturity monitoring analysis. At the start of the project, retailers and wholesalers were contacted to identify the Brix standard they were using, and 10° Brix was identified as the de facto standard across all melons. The average Brix of each melon was then compared with the standard to decide if it met or exceeded the standard. This data was aggregated to create a measure called Brix compliance.

### Consumer taste panels

The Consumer Sensory Team at the Queensland Department of Agriculture and Fisheries (QDAF) in Brisbane managed the sensory analyses. The QDAF consumer sensory team followed a methodology developed in collaboration with Delytics and selected a group of panellists who were representative of the wider Australian population for the consumer sensory analysis.

Two sets of panels were held in October/November 2022 and March 2023 to assess fruit from different Australian geographic regions. Each panel set lasted three weeks, split into one week each for seedless watermelon, rock melon and honeydew. The fruit for the panels was sourced from growers who were able to supply the team with a wide range of fruit maturities in time for the panels. Any additional fruit required was sourced from the Brisbane Market.

To provide data on the influence of various fruit properties on consumer liking, the Brix, pH, acid, firmness and flesh colour of each sample were measured before tasting. Consumer liking was measured using the 9-point hedonic scale developed by Dr. David Peryam (1957). Panellists were asked to score flavour liking, texture liking and overall liking. The fruit for the panels was carefully chosen to ensure that panellist scores covered the entire range.

The QDAF team collated the fruit property data with the liking scores and sent all data to Delytics for analysis. The main analyses comprised modelling the relationship between consumer liking and the measured fruit properties.

### Melon quality improvement workshop

The project plan included a stakeholder workshop similar to that undertaken in the table grape project TG17002 where industry participants from across the supply chain, including growers, marketers and retailers, were invited to discuss the options for the new standards and agree on how they will be set and adopted. Before this event was held, all taste panels were completed and the data analysed, so the participants would have sufficient information for their decision making. The project team also provided an analysis of the then current maturity status of fruit in the wholesale and retail markets.

In planning for this workshop, a Project Reference Group (PRG) meeting was held on 12 July 2023 to give PRG members an opportunity to recommend who should attend the workshop. The aim was to include representatives across the whole melon supply chain.

Several weeks before the stakeholder workshop, the project team ran a webinar that was available to all members of the melon supply chain. The webinar outlined the core information that would allow supply chain participants to understand the issues, provide feedback and inform their industry representative of any items they wanted to discuss at the workshop. The webinar was recorded and made available through the Melons Australia website, so that anyone who missed the live event could view it later.

### Grower roadshows

Participation in the Melons Australia grower roadshows was an important part of the overall project communication. At each grower roadshow, the project objectives and findings were presented. This provided an opportunity for growers to ask questions and allowed the project team to understand grower issues and concerns as well as their vision for their industry.

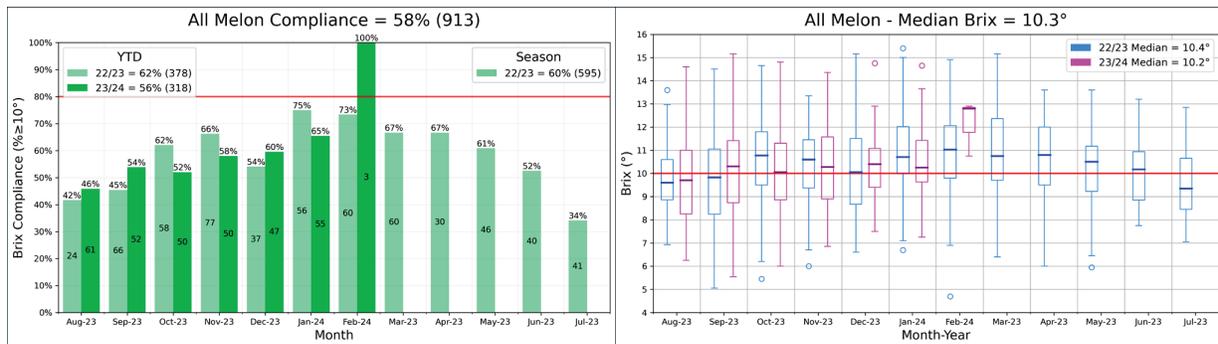
## Results and discussion

### Wholesale and retail maturity monitoring

The following section presents the results for all melons first, then separately for watermelon, rock melon and honeydew. The minimum Brix standard for all melons in the following analyses is 10°, as that was the most prevalent standard used by the industry at the start of this project. As the new standards have not been adopted yet, these results are based on the old standards.

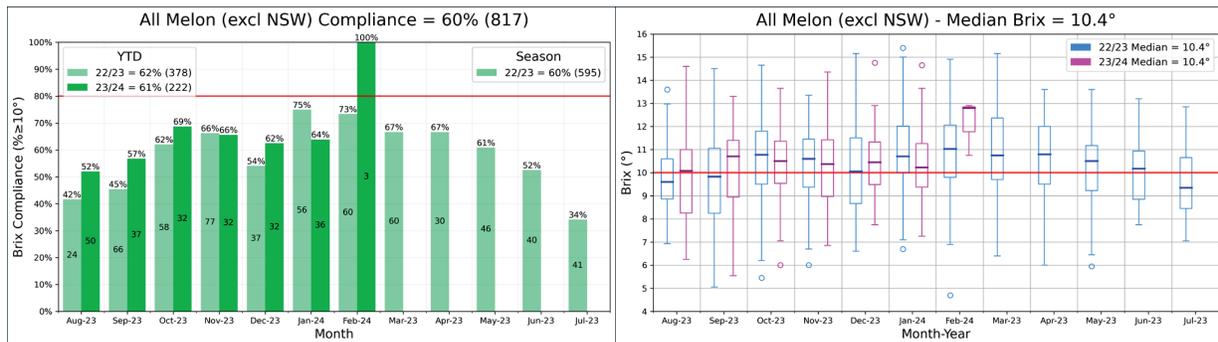
#### All Melons

The Brix compliance of all melons by month and year is shown below alongside the average Brix for each month as box plots<sup>1</sup>. The left graph shows a target of 80% (which was the target agreed at the stakeholder workshop) and the right graph shows a Brix target of 10°.



Both graphs show that melons have higher Brix during the summer months, with Brix compliance close to the minimum of 80%, but this drops to a low of 34% in the winter. This result is interesting as melons are grown in the tropics as well as the temperate regions of Australia to provide a year-round supply.

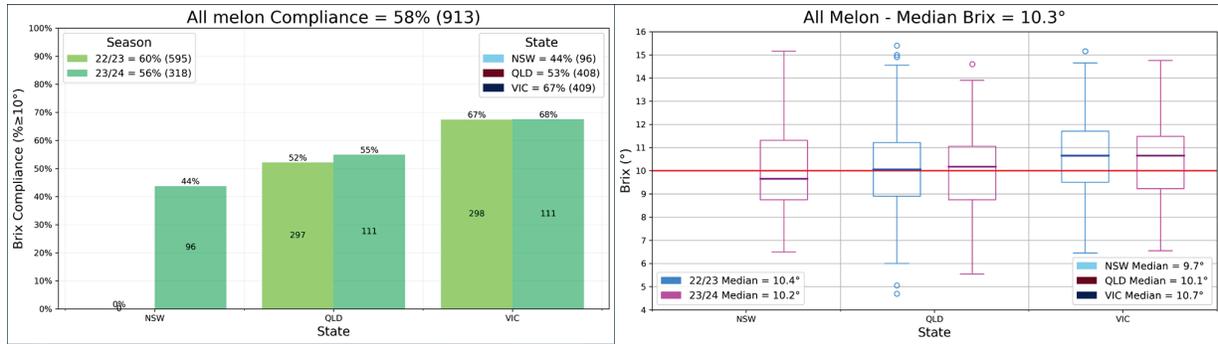
With the onset of El Niño in 2023, it was anticipated that the 2023/24 season would be better than the previous season. The YTD figures (56%) for 2023/24 were lower than the same period (62%) in 2022/23. Knowing that the 2022/23 data was for QLD and VIC only, the 2023/24 data was reprocessed to exclude NSW so a valid seasonal comparison could be made.



The above graphs show a similar compliance in 2023/24 and in 2022/23 when the NSW data was excluded.

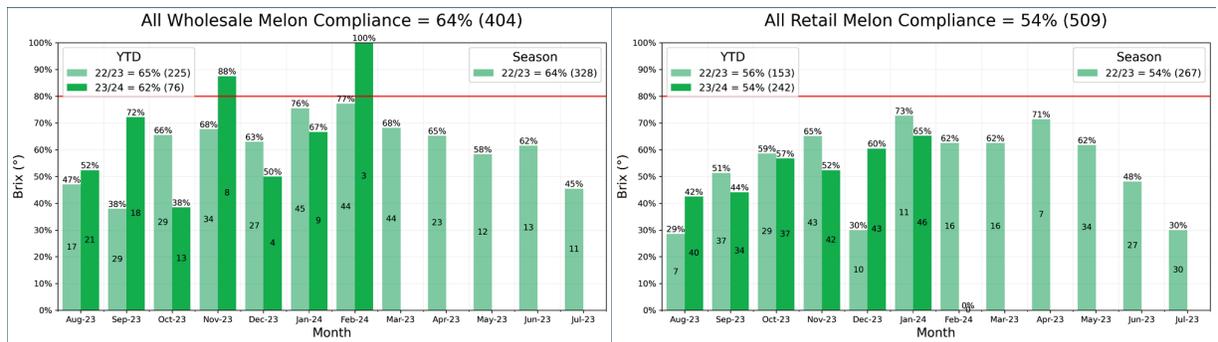
As stated above, Sydney was added to the cities (and States) where melons were monitored in August 2023. This was because the Brix compliance of melons in Brisbane and Melbourne were quite different. The data from Sydney (NSW) was different again with a much lower Brix compliance than QLD and VIC as shown below.

<sup>1</sup> A boxplot is a graph that shows a data set's 25<sup>th</sup>, 50<sup>th</sup> and 75<sup>th</sup> percentiles in a box, with minimum and maximum whiskers plus outliers.



The reasons for these differences in Brix between states is currently not well understood. However, as shown in the following section, the Brix for retail watermelons in NSW is very low.

Differences between wholesale and retail were also observed with the melons at wholesale having a higher Brix compliance than melons at retail.

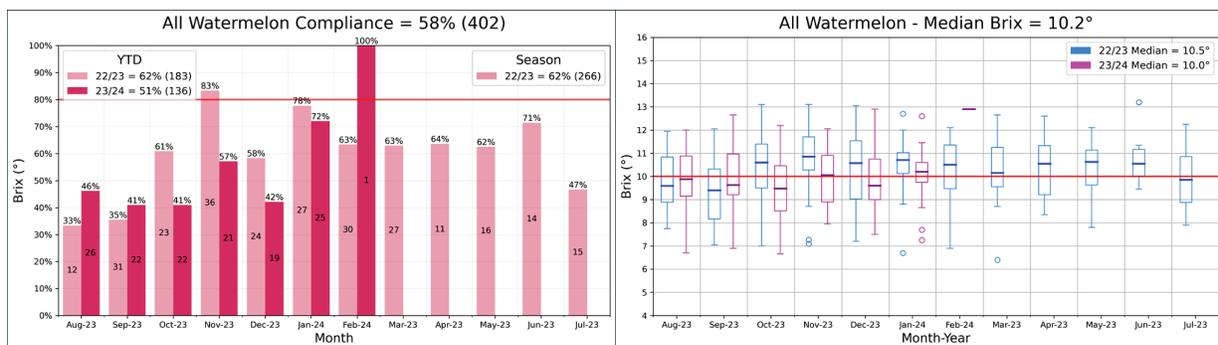


One of the potential reasons that may explain some of these differences is that the weight of fruit at retail is lower than the fruit at wholesale. This will be discussed in more detail in the section on watermelon.

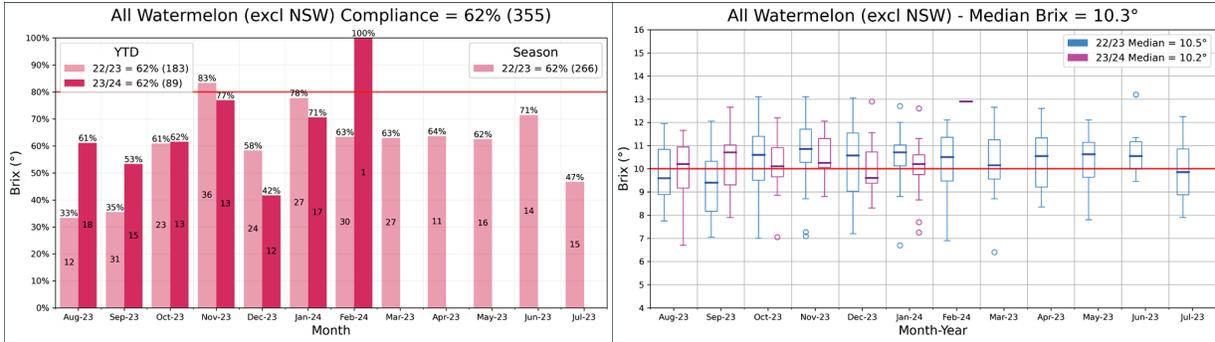
The results for all melons provide a broad picture of the status of melon maturity available to consumers. It is instructive to now review the results for the main melon types in more detail.

### Watermelon

The Brix compliance of watermelons by month and year is shown alongside the average Brix each month as box plots.

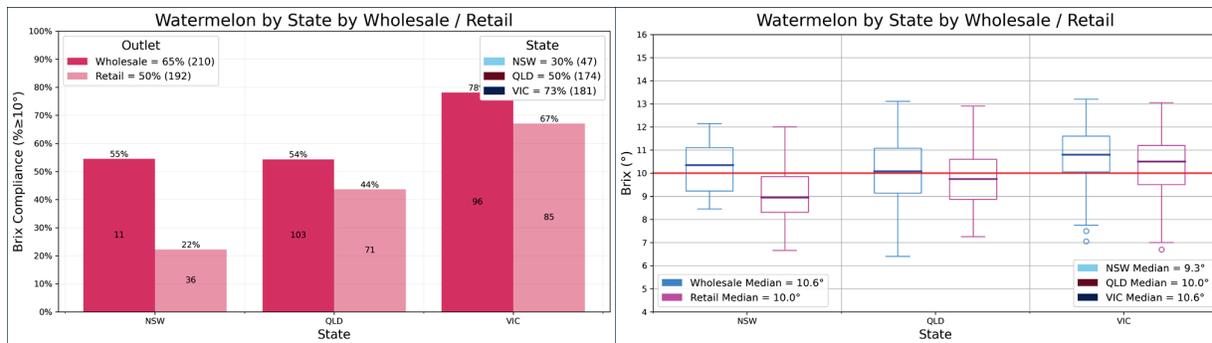


The YTD compliance (51%) for 2023/24 was considerably lower than for the same period (62%) in 2022/23. Knowing that the 2022/23 data was for QLD and VIC only, the 2023/24 data was reprocessed to exclude NSW so a valid seasonal comparison could be made.



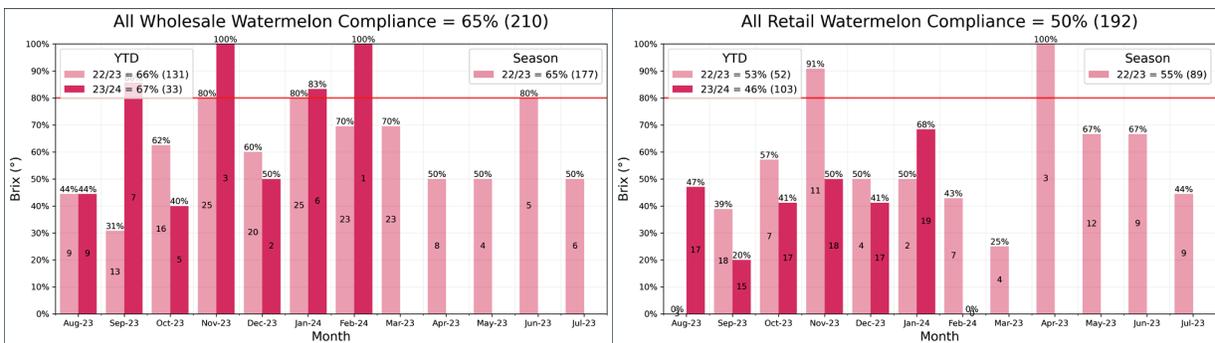
The above graphs show similar YTD Brix compliance in 2023/24 and in 2022/23 when the NSW data is excluded albeit with considerable monthly variability.

Monitoring in Sydney was started in August 2023. Of particular concern is the left graph below, where the wholesale Brix compliance for NSW is similar to QLD, but the retail compliance is only 22% on 36 inspections. The graph on the left below reveals the Brix of retail watermelons in Sydney is very low, resulting in the low compliance.



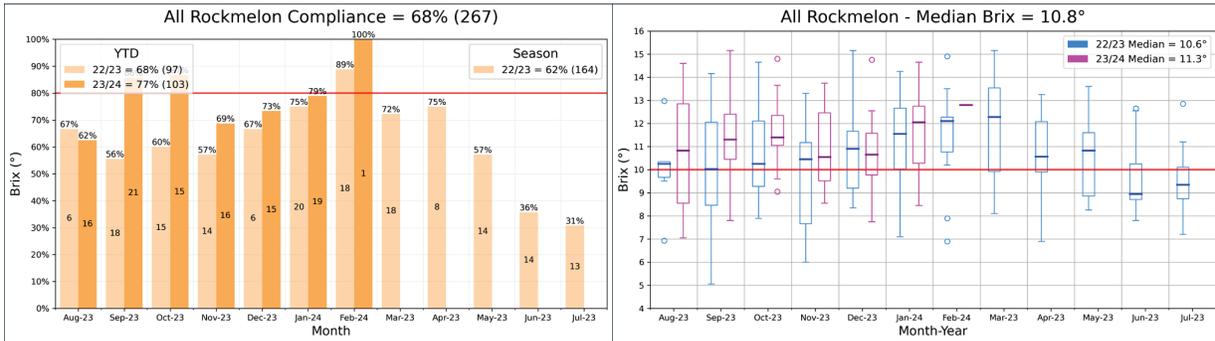
The very low compliance of watermelons at retail in NSW negatively influences not only the NSW results but the overall results as well.

Significant differences between all wholesale and retail monitoring were observed, with the watermelons at wholesale having a higher Brix compliance than the watermelons at retail. This was consistent with the previous graphs.



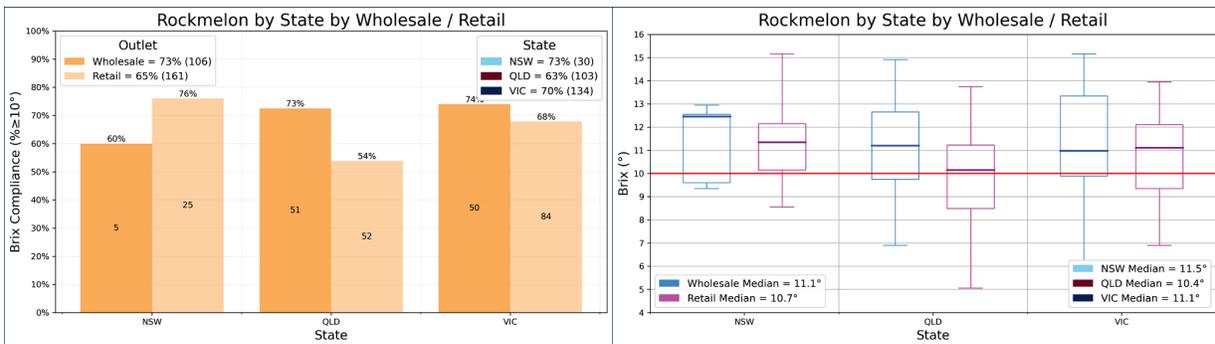
### Rock melon

The Brix compliance of rock melons by month and year is shown below alongside the average Brix each month as box plots.

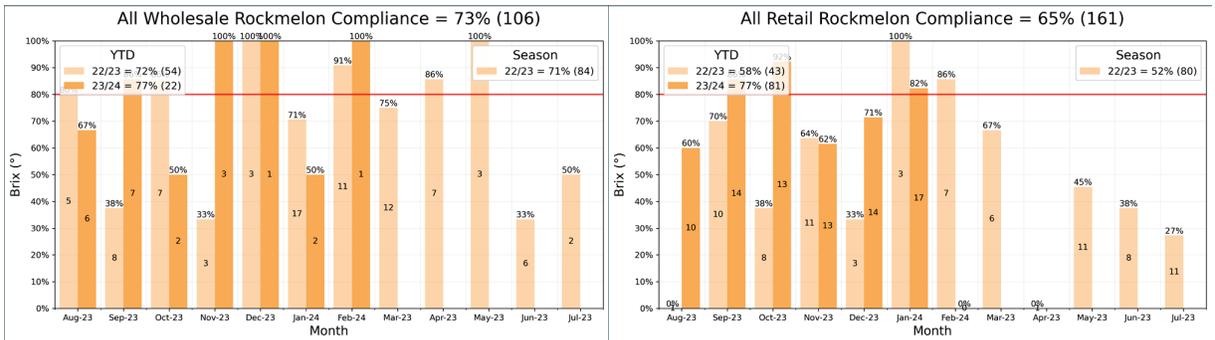


Both graphs show that rock melons have higher Brix from August to May in 2022/23, but this drops to a low of 31% in the winter. The YTD figure (77%) for 2023/24 was higher than for the same period (68%) in 2022/23.

All states had differences in Brix compliance at retail and wholesale.



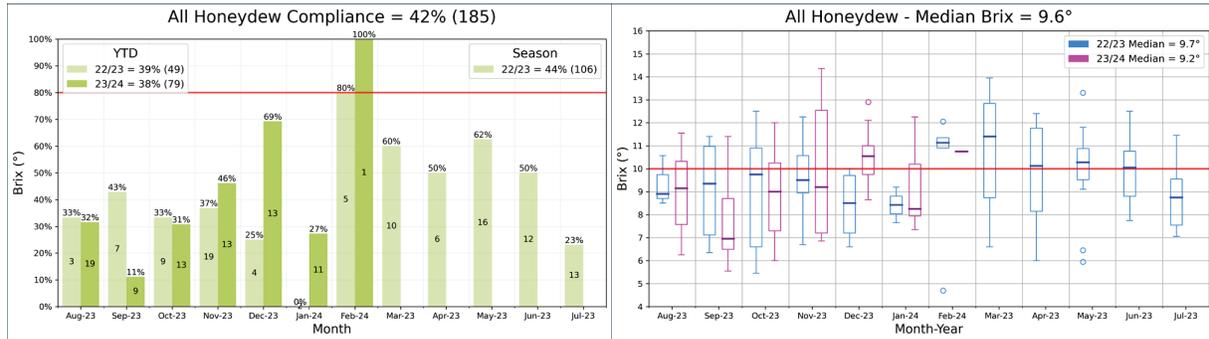
Differences between wholesale and retail were also observed, with the rock melons at wholesale having a higher Brix compliance than the rock melons at retail.



Overall rock melons were the most consistent of all melons.

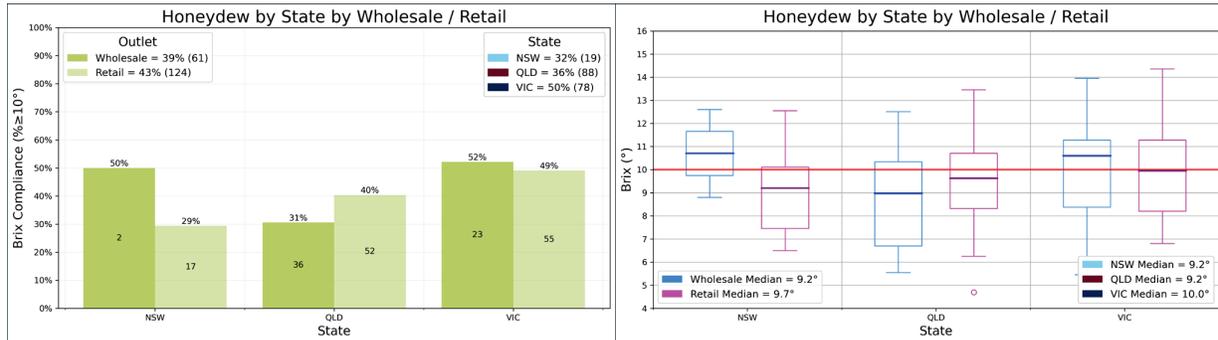
### Honeydew

The Brix compliance of honeydew by month and year is shown below alongside the average Brix each month as box plots.

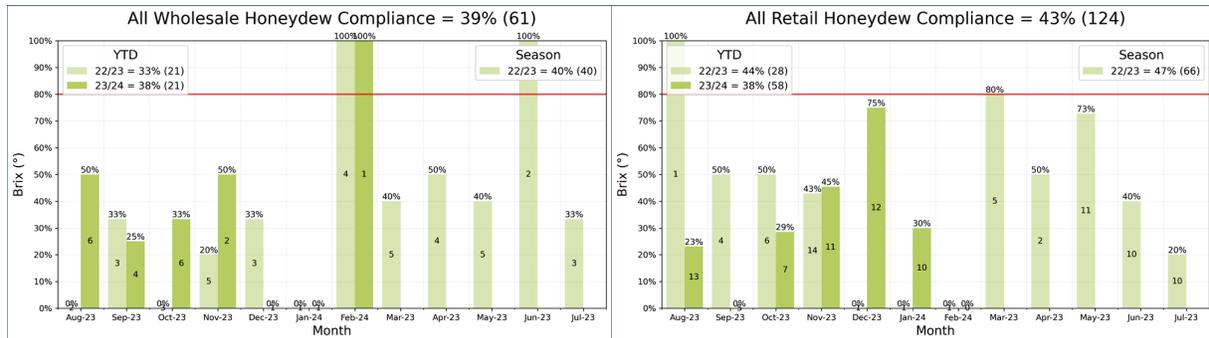


Overall honeydew had the lowest Brix compliance of all melons. Both graphs above show that honeydew had higher Brix in summer 2022/23, but compliance drops in the winter. The overall Brix compliance of 44% in 2022/23 highlights an issue with supplying the market with fruit that consumers will like. The YTD figures (38%) for 2023/24 were similar to the same period (39%) in 2022/23, although both results are very low.

All states have low Brix compliance, with VIC higher than NSW and QLD.



Differences between wholesale and retail were observed, with a lot of noise in both data sets.



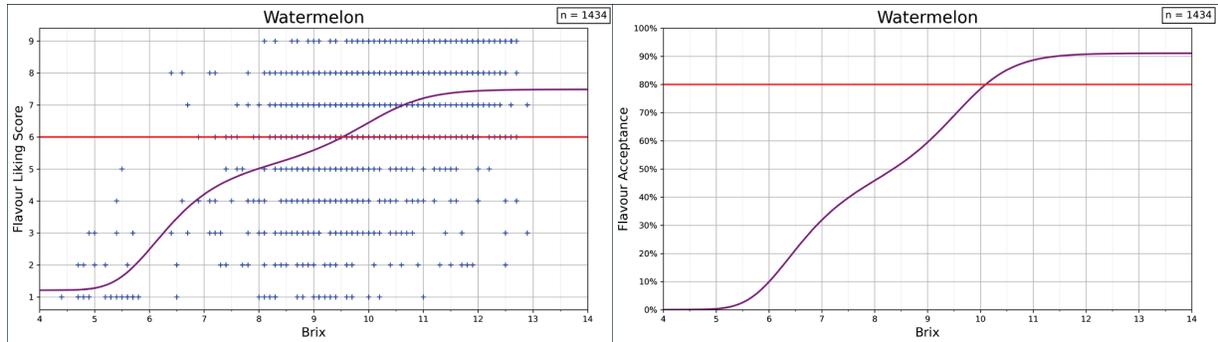
### Consumer taste panels

Fruit properties of each melon sample measured before tasting included Brix, pH, acid, firmness, and flesh colour. Consumer liking was measured using the 9-point hedonic scale where panellists were asked to score flavour liking, texture liking and overall liking. The focus of the analyses was on fruit properties that could be used to predict consumer acceptance. Brix was the key maturity measure selected by participants in the Melon Quality Improvement Project Stakeholder Workshop. As a result, the following results will focus on Brix.

The analyses of the pH and acid data showed no real influence of either measure on consumer acceptability. Texture acceptability did respond to firmness, and consumer acceptability responded to flesh colour. However, the workshop participants decided not to include texture or colour criteria in the minimum maturity standards at this stage.

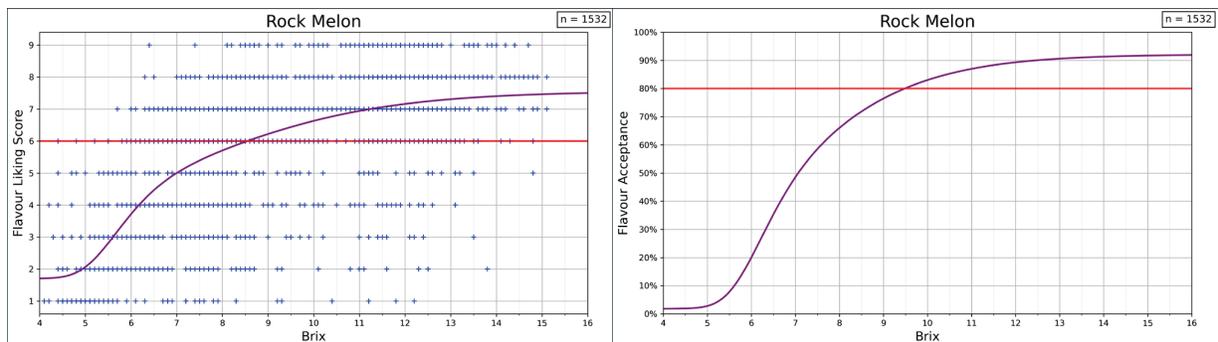
### Watermelon

The following graphs show the flavour liking and flavour acceptance vs Brix for watermelon with a model fitted to each dataset. The flavour liking vs Brix model passes through a score of 6 (like slightly) at approximately 9.5° Brix. At this Brix around 70% of the consumer panellists liked the watermelon sample (right graph). The acceptance model passes through 80% acceptance at just over 10° Brix.



### Rock melon

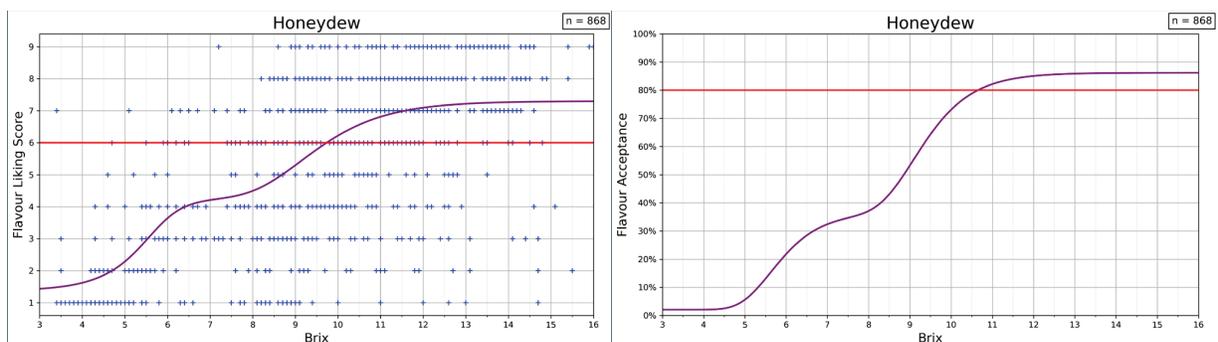
The graphs below show the flavour liking and flavour acceptance vs Brix for rock melon. The flavour liking vs Brix model passes through a score of 6 (like slightly) at approximately 8.5° Brix. At this Brix just over 70% of consumers liked the rock melon sample. The acceptance model passes through 80% acceptance at just over 9.5° Brix.



The consumer sensory panellist scores achieved 80% acceptance for rock melon at a slightly lower Brix than watermelon.

### Honeydew

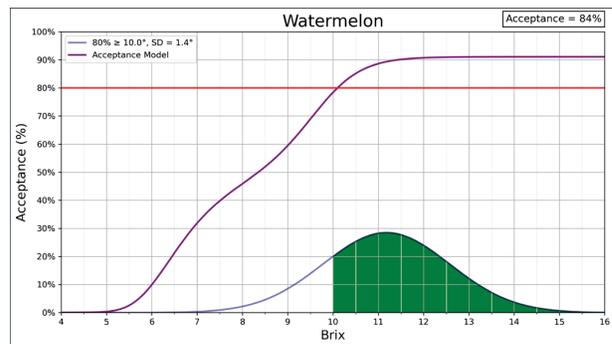
The following graphs show the flavour liking and flavour acceptance vs Brix for honeydew with biphasic sigmoids fitted to the data. The flavour liking vs Brix model passes through a score of 6 (like slightly) at approximately 9.7° Brix. At this Brix around 70% of consumers liked the honeydew sample (right graph). The acceptance model passes through 80% at just over 10.5° Brix.



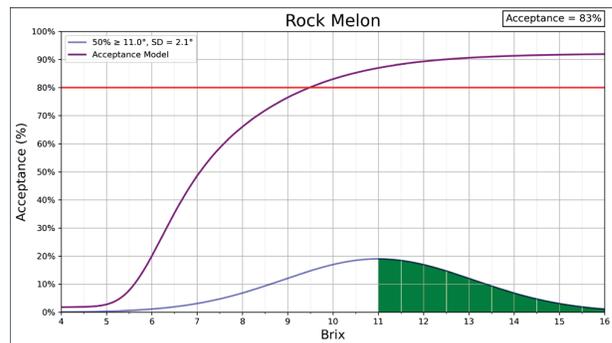
The consumer sensory panellist scores achieved 80% acceptance for honeydew at a higher Brix than watermelon and rock melon.

## The influence of Brix variability on consumer acceptance

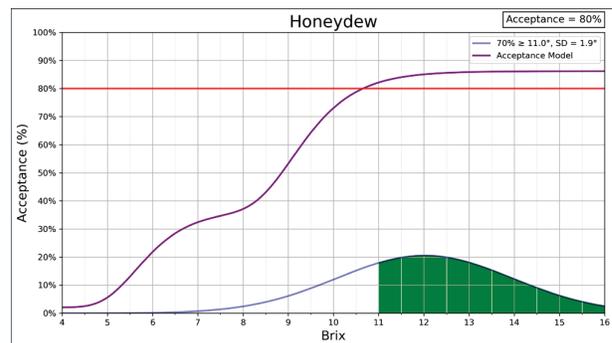
The taste panel results established that 80% of the consumer panellists liked seedless watermelon at 10° Brix. However, to consistently achieve the target 80% consumer acceptability, watermelon growers need to allow for Brix variability. The project team used the Brix variability (SD=1.4°) of the watermelon monitoring data to estimate on-farm Brix variability (which will be measured in the next project). The graph on the right shows the watermelon acceptance as a purple curve and a consignment of watermelons (shown in green) with the above-mentioned Brix variability of 1.4°. The graph shows 80% of the watermelon had a Brix  $\geq 10^\circ$ . Simulating this scenario (using Monte Carlo) predicts that the consumer acceptability of that consignment will be 84% (top right), exceeding the minimum acceptance of 80%.



Exploring a similar scenario for rock melon, the Brix variability (SD=2.1°) of the rock melon monitoring data was used. The graph on the right shows the rock melon acceptance curve as well as a consignment of rock melons with a Brix variability of 2.1° and 50% of the melons having a Brix  $\geq 11^\circ$ . Simulating this scenario predicts that the consumer acceptability of that consignment will be 83%, exceeding the minimum acceptance of 80%.



For honeydew melons, the Brix variability (SD=1.94°) of the honeydew monitoring data was used. The graph on the right shows the honeydew acceptance curve as well as a consignment of honeydew melons with a Brix variability of 1.94° and 70% of the melons having a Brix  $\geq 11^\circ$ . Simulating this scenario predicts that the consumer acceptability of that consignment will be 80%, just meeting the minimum acceptance of 80%.



## Melon quality improvement workshop

The Melon Quality Improvement Project Stakeholder Workshop was held on Friday 6 October 2023 in Brisbane.

The meeting was attended in person by over 20 people, comprising representatives from the major supermarkets, growers, wholesalers, marketers, seed companies, Melons Australia, Hort Innovation and Delytics project team members. There was one online attendee from a seed company who was also a Melons Australia Board Member.

Prior to this in-person event, a Webinar was held on Monday 11 September 2023 to provide all growers with the opportunity to see, hear and understand the situation and the issues. The webinar was attended live by 25 industry members and was recorded and placed online to allow growers to view it and provide feedback at a time that suited them before the workshop. Since that time, the webinar has had 210 unique views (approx. 12% of visits to the Melons Australia website).

The Stakeholder Workshop participants were shown a detailed analysis of the retail and wholesale monitoring data. The overall results were that Brix compliance ( $\geq 10^\circ$ ) from August 2022 through July 2023 was 60%. Interestingly, retail compliance was 54% compared to 64% at wholesale. Some reasons for this were explored but no firm conclusion was reached. There was also a difference in compliance between the states during August and September 2023, with VIC at 60%, QLD at 48% and NSW at 35%. Reasons for this were not obvious. Similar analyses for seedless watermelon (62%), rock melon (62%) and honeydew (44%) were presented.

Given that the overall Brix compliance was 60% at that time, the participants were asked where they thought the consumer acceptability should be set. After discussion, a figure of 80% for consumer acceptability was agreed as an initial target. All workshop participants agreed that the industry needed to lift its performance in terms of consumer acceptability.

Using 80% consumer acceptability as the initial target, the participants reviewed the analyses of the taste panel data for seedless watermelon, rock melon, and honeydew. The sensory team measured Brix, firmness, acid, pH and colour for every sample tasted. The participants agreed that Brix would be the primary maturity measure for the time being and supported the analysis that suggested that acid and pH were not statistically important in setting the standards. Firmness and colour did influence liking, but the meeting participants agreed not to include those in the new maturity standards at this time.

The influence of on-farm Brix variability on consumer acceptability was also demonstrated as that affected how the standards would be set.

The workshop participants all agreed that the standards needed to increase so that consumer acceptability would improve. There were some differing views on how the standards should be described to achieve the desired outcome.

The agreed options to meet the target minimum consumer acceptability of 80% include:

- **Seedless watermelon by  $\geq 80\%$  of fruit in a sample with a Brix  $\geq 10^\circ$ .**  
It was noted that it could have been set higher, and the workshop supported a two-step process.
- **Rock melon with by  $\geq 50\%$  of fruit in a sample with a Brix  $\geq 12^\circ$ .**  
It was noted that this is significantly higher than the current standard and supported data being considered, and this specification being further explored.
- **Honeydew by  $\geq 80\%$  of fruit in a sample with a Brix  $\geq 11^\circ$ .**  
The workshop identified that this is significantly higher than the current standard and supported this being further explored. It was also noted that there needs to be further engagement between the industry and the retail sector to explore honeydew standards beyond just Brix. This is outside the remit of this project.

Following the Workshop, the Melons Australia Board met on 10 October 2023 and were requested to provide the project team with their support for an initial set of standards. The Melons Australia Board supported the following standards being further explored with industry through the upcoming Roadshow series.

For seedless watermelon an initial target of  $80\% \geq 10^\circ$  with the view of supporting industry to meet  $10^\circ$ , then look to increase to  $11^\circ$ . Rock Melon  $50\% \geq 11^\circ$  (or  $12^\circ$ ), and honeydew  $70\% \geq 11^\circ$  (or  $12^\circ$ ) with options being explored at the upcoming grower roadshows. All the above standards, when met, will achieve greater than 80% consumer acceptability.

These standards were supported, noting that there remained a need to further test these with industry as a 'Draft Standard' before the establishment of Phase 2 of the Melon Quality Improvement work. The Board supported these being set as interim standards that were realistic and achievable in the short term with the view to increasing them as the industry showed that these could be met.

There was support for a 12-month implementation process for the Draft Standards both at the stakeholder workshop and by the Melons Australia Board. It was noted by all parties that Phase 2 of the Quality Improvement work will support the implementation of the draft standards by developing tools and on farm practices that will help the supply chain to meet the new standards and achieve success.

## Outputs

Table 1. Output summary.

Output	Description	Detail
Articles in Melon News (6-monthly magazine)	Project Update	<p>Melon News July 22, referenced at <a href="https://www.melonsaustralia.org.au/news-and-resources/publications/magazine">https://www.melonsaustralia.org.au/news-and-resources/publications/magazine</a> on page 12 of magazine (p14 of pdf)</p> <p>Melon News December 22, referenced at <a href="https://www.melonsaustralia.org.au/news-and-resources/publications/magazine">https://www.melonsaustralia.org.au/news-and-resources/publications/magazine</a> on page 13 of magazine (p13 of pdf)</p> <p>Melon News June 2023, referenced at <a href="https://www.melonsaustralia.org.au/news-and-resources/publications/magazine">https://www.melonsaustralia.org.au/news-and-resources/publications/magazine</a> lead article on pages 6 &amp; 7 of the magazine (Pp 8 &amp; 9 of pdf)</p> <p>Melon News December 2023, referenced at <a href="https://www.melonsaustralia.org.au/news-and-resources/publications/magazine">https://www.melonsaustralia.org.au/news-and-resources/publications/magazine</a> lead article on pages 6 &amp; 7 of the magazine (Pp 8 &amp; 9 of pdf)</p>
Updates in Melon E-News	Regular Project updates	<p>All Melon E-News can be found at <a href="https://www.melonsaustralia.org.au/news-and-resources/publications/enews">https://www.melonsaustralia.org.au/news-and-resources/publications/enews</a></p> <p>Project updates were included in these issues:</p> <ul style="list-style-type: none"> <li>• September 2022</li> <li>• March 2023</li> <li>• April 2023</li> <li>• May 2023</li> <li>• October 2023</li> </ul>
LinkedIn Posts	Updates on project activities	<ul style="list-style-type: none"> <li>• <a href="https://www.linkedin.com/posts/markloeffen_aussiemelons-freshproduce-fruit-activity-6960342291412635648-3QYQ?utm_source=share&amp;utm_medium=member_desktop">https://www.linkedin.com/posts/markloeffen_aussiemelons-freshproduce-fruit-activity-6960342291412635648-3QYQ?utm_source=share&amp;utm_medium=member_desktop</a></li> <li>• <a href="https://www.linkedin.com/posts/markloeffen_aussiemelons-freshproduce-fruit-activity-6970850641086754817-3RTR?utm_source=share&amp;utm_medium=member_desktop">https://www.linkedin.com/posts/markloeffen_aussiemelons-freshproduce-fruit-activity-6970850641086754817-3RTR?utm_source=share&amp;utm_medium=member_desktop</a></li> <li>• <a href="https://www.linkedin.com/posts/johnathon-davey-03a27779_team-events-aussiemelons-activity-6988780405671809024-WWLH?utm_source=share&amp;utm_medium=member_desktop">https://www.linkedin.com/posts/johnathon-davey-03a27779_team-events-aussiemelons-activity-6988780405671809024-WWLH?utm_source=share&amp;utm_medium=member_desktop</a></li> <li>• <a href="https://www.linkedin.com/posts/johnathon-davey-03a27779_quality-improvement-project-underway-for-activity-6955125201953071104-luaF?utm_source=share&amp;utm_medium=member_desktop">https://www.linkedin.com/posts/johnathon-davey-03a27779_quality-improvement-project-underway-for-activity-6955125201953071104-luaF?utm_source=share&amp;utm_medium=member_desktop</a></li> <li>• <a href="https://www.linkedin.com/posts/markloeffen_aussiemelons-freshproduce-melon-activity-7046589959255838720-OPkS?utm_source=share&amp;utm_medium=member_desktop">https://www.linkedin.com/posts/markloeffen_aussiemelons-freshproduce-melon-activity-7046589959255838720-OPkS?utm_source=share&amp;utm_medium=member_desktop</a></li> <li>• <a href="https://www.linkedin.com/posts/markloeffen_melon-melonquality-melongrowers-activity-7044539385744134144-VAWa?utm_source=share&amp;utm_medium=member_desktop">https://www.linkedin.com/posts/markloeffen_melon-melonquality-melongrowers-activity-7044539385744134144-VAWa?utm_source=share&amp;utm_medium=member_desktop</a></li> <li>• <a href="https://www.linkedin.com/posts/melons-australia_melonquality-discussion-melongrowers-activity-">https://www.linkedin.com/posts/melons-australia_melonquality-discussion-melongrowers-activity-</a></li> </ul>

		<p><a href="https://www.linkedin.com/posts/melons-australia_aussiemelons-freshproduce-fruit-activity-7102399840701087745-he0x?utm_source=share&amp;utm_medium=member_desktop">7112939378745778176-oojk?utm_source=share&amp;utm_medium=member_desktop</a></p> <ul style="list-style-type: none"> <li>• <a href="https://www.linkedin.com/posts/melons-australia_aussiemelons-freshproduce-fruit-activity-7102399840701087745-he0x?utm_source=share&amp;utm_medium=member_desktop">https://www.linkedin.com/posts/melons-australia_aussiemelons-freshproduce-fruit-activity-7102399840701087745-he0x?utm_source=share&amp;utm_medium=member_desktop</a></li> </ul>
Grower roadshows and farm visits	Participation in and presentations at grower roadshows and farm visits	<ul style="list-style-type: none"> <li>• 10 melon grower roadshows were delivered by Melons Australia in the 2022/23 financial year. In total over 170 people attended the events, including over 57 growers.</li> <li>• Grower roadshows were held in Ayr (10 October 2022), Tully (13 October 2022), Kununurra (17 October 2022), Katherine (19 October 2022), Barmera (30 October 2023), Mildura (31 October 2023), Griffith (2 November 2023), and Ayr (14 November 2023).</li> <li>• The project team delivered a 15–20-minute project progress presentation at all 10 roadshows.</li> <li>• At each roadshow there was a lot of interest and discussion about this project and its intended outcomes.</li> <li>• Grower roadshows were typically held late afternoon and into the evening. During the rest of the day the team visited farms to have one-on-one discussions with growers to discuss the project and update them on the performance of their fruit when their data was available.</li> </ul>
Fresh Plaza Article	Project update	<a href="https://www.freshplaza.com/europe/article/9526142/setting-the-standard-to-improve-eating-quality-of-australian-melons/?utm_medium=email">https://www.freshplaza.com/europe/article/9526142/setting-the-standard-to-improve-eating-quality-of-australian-melons/?utm_medium=email</a>
Webinar	Prelude to the Workshop	<p>The Webinar, held on Monday 11 September 2023, took a deeper dive into the data and analytics through the 12-months of sampling and consumer taste panels, and sought to gather industry comments, insight and concerns about the development of new maturity standards for the Australian melon industry. The webinar can be viewed at <a href="https://www.melonsaustralia.org.au/news-and-resources/webinars-and-podcasts">https://www.melonsaustralia.org.au/news-and-resources/webinars-and-podcasts</a></p>
Melon Supply Chain Stakeholder Workshop	For melon supply chain representatives to agree on a new set of minimum maturity standards	<ul style="list-style-type: none"> <li>• The Melon Quality Improvement Project Stakeholder Workshop was held on Friday 6 October in Brisbane.</li> <li>• Based on decisions at the meeting and a follow-up Melons Australia Board meeting on 10 October 2023 the following standards were agreed. <ul style="list-style-type: none"> <li>• Consumer acceptability: an initial target of 80%.</li> <li>• Seedless watermelon: 80% ≥ 10°</li> <li>• Rock Melon: 50% ≥ 11°, and</li> <li>• Honeydew: 70% ≥ 11°.</li> </ul> </li> <li>• All the above standards, when met, will achieve greater than 80% consumer acceptability. Workshop participants and the Melons Australia Board supported a 12-month implementation process for the Standards alongside Phase 2 of the project that will develop tools and on-farm practices and through the supply chain to achieve success.</li> </ul>

## Outcomes

Table 2. Outcome summary

Outcome	Alignment to fund outcome, strategy and KPI	Description	Evidence																																										
Australian melon growers, marketers and major supermarkets have adopted the harmonised minimum maturity standards	This project will meet Outcome 1, Strategy 5 of the Melon Strategic Investment Plan 2022-2026, to ‘Establish quality standards to improve consumer acceptance of Australian melons.’	An initial set of minimum maturity standards designed to consistently achieve ≥ 80% consumer acceptability was agreed and set at the Melon Quality Improvement Stakeholder Workshop (in Brisbane on 6 October 2023). These were endorsed by the Melons Australia Board. These new standards have been socialised at grower roadshow meetings in Riverina and the Burdekin. A significant focus for phase 2 of this project will be to develop tools that will help growers consistently meet these standards. This output directly meets the outcome statement in that new standards have been agreed.	<b>Excerpt from the October 2023 Melon E-News.</b> During September 2023 and early October 2023, the Quality Improvement project team engaged on many levels with the melon industry supply chain, which culminated in a Maturity Standards workshop being held on Friday 6th October 2023. This workshop made several recommendations with regards the future quality standards for the melon industry, which were: <ul style="list-style-type: none"> <li>• <b>Seedless Watermelon</b> have a minimum standard of 80% fruit ≥ 10° Brix.</li> <li>• <b>Rock melon</b> have a minimum standard of 50% fruit ≥ 11° Brix.</li> <li>• <b>Honeydew</b> have a minimum standard of 70% fruit ≥ 11° Brix.</li> </ul>																																										
The percentage of melons meeting the minimum quality requirements is increasing.	The project will also contribute to increased repeat purchases and value for Australian melons.  SIP KPI: Increased consumer purchase frequency	Steady progress, despite significant weather challenges in August and September 2022. A significant improvement was seen in the summer which dropped again in winter. Starting in August 2023, Brix compliance was like the previous year. Fruit quality is weather dependent and new standards have only just been agreed but not yet adopted. The phase 2 project will provide growers with the tools they need to implement and adopt the new standards.	<p><b>All Melon (excl NSW) Compliance = 60% (817)</b></p> <table border="1"> <thead> <tr> <th>Month</th> <th>22/23 Compliance (%)</th> <th>23/24 Compliance (%)</th> </tr> </thead> <tbody> <tr><td>Aug 22</td><td>24</td><td>52</td></tr> <tr><td>Sep 22</td><td>66</td><td>45</td></tr> <tr><td>Oct 22</td><td>58</td><td>57</td></tr> <tr><td>Nov 22</td><td>77</td><td>62</td></tr> <tr><td>Dec 22</td><td>57</td><td>66</td></tr> <tr><td>Jan 23</td><td>54</td><td>64</td></tr> <tr><td>Feb 23</td><td>37</td><td>75</td></tr> <tr><td>Mar 23</td><td>56</td><td>73</td></tr> <tr><td>Apr 23</td><td>60</td><td>67</td></tr> <tr><td>May 23</td><td>30</td><td>67</td></tr> <tr><td>Jun 23</td><td>46</td><td>61</td></tr> <tr><td>Jul 23</td><td>40</td><td>52</td></tr> <tr><td>Aug 23</td><td>41</td><td>64</td></tr> </tbody> </table> <p>From the above it is clear that melon Brix compliance is steady, comparing the 2023/24 season to the 2022/23 season. As Brix compliance increases, more consumers will enjoy positive taste experiences leading to increased purchase frequency.</p>	Month	22/23 Compliance (%)	23/24 Compliance (%)	Aug 22	24	52	Sep 22	66	45	Oct 22	58	57	Nov 22	77	62	Dec 22	57	66	Jan 23	54	64	Feb 23	37	75	Mar 23	56	73	Apr 23	60	67	May 23	30	67	Jun 23	46	61	Jul 23	40	52	Aug 23	41	64
Month	22/23 Compliance (%)	23/24 Compliance (%)																																											
Aug 22	24	52																																											
Sep 22	66	45																																											
Oct 22	58	57																																											
Nov 22	77	62																																											
Dec 22	57	66																																											
Jan 23	54	64																																											
Feb 23	37	75																																											
Mar 23	56	73																																											
Apr 23	60	67																																											
May 23	30	67																																											
Jun 23	46	61																																											
Jul 23	40	52																																											
Aug 23	41	64																																											

## Monitoring and evaluation

**Table 3. Key Evaluation Questions**

Key Evaluation Question	Project performance	Continuous improvement opportunities
To what extent has the project developed minimum quality standards?	The project set a minimum target for consumer acceptability first, and from that developed a set of minimum maturity standards for seedless watermelon, rock melon and honeydew that were agreed by representatives of the entire melon supply chain and endorsed by the Melons Australia Board. This item has been fully met.	Having developed a set of minimum maturity standards, phase 2 of the Melon Quality Improvement project will work with growers to develop tools and on-farm practices that will assist them to consistently meet the standards. Phase 2 will also review and recommend changes to supply chain issues that impact fruit quality.
To what extent has the industry agreed on the minimum quality standards?	The minimum, maturity standards have been agreed by representatives of the entire melon supply chain and endorsed by the Melons Australia Board. This item has been fully met.	Representatives of the entire melon supply chain have agreed on these new standards but will need support to adopt them fully, so they become normal business practice in future.
Have regular project updates been provided through linkage with the industry communication project?	Yes, regular project updates have been provided. See Outputs section of this report for details.	Continue to partner with Melons Australia and their communications staff and ensure that phase 2 has an adequate communications budget.
How accessible were extension events to industry levy payers?	Grower roadshows and farm visits were delivered to all key melon growing areas in Australia. See Outputs section of this report for details.	Continue to partner with Melons Australia and their grower roadshows and ensure that phase 2 has an adequate travel budget.
What efforts did the project make to improve efficiency?	All project partners have a continuous improvement attitude. With regular communication between parties, any issues are dealt with quickly and solutions found with within and between parties.	Delytics is continuously improving its systems and back-end software to ensure ongoing performance improvements.

## Recommendations

The key reason for the low Brix compliance evidenced by the monitoring results is that too many melons are being harvested before they reach 10° Brix. The reasons for this are many and complex, so the phase 2 project should be designed to include workable solutions for growers that will provide them with the tools and processes they will need to help them harvest their fruit at the right maturity.

After melons are harvested no more sugars can enter the fruit, so the sugars that are there at harvest are what consumers will experience. After harvest there are two processes that can affect Brix: dehydration and respiration. Dehydration reduces the overall water content of the fruit and increases Brix because Brix is expressed as a percentage. Conversely, respiration reduces Brix as the carbon dioxide released is sourced primarily from sugars. Researchers have found that these two systems typically balance each other out, resulting in the Brix at retail being very similar to the Brix at harvest.

A set of minimum maturity standards has now been agreed by representatives of the entire melon supply chain, including major retailers. Delytics, through working with several other horticultural industries in Australia and New Zealand, has found that new standards, in and of themselves, are not sufficient to enable change without robust supporting systems. The standards require an associated set of on-farm and post-farm protocols and processes to be developed and adopted across the supply chain to enable growers and all supply chain participants to consistently meet the standards.

The authors recommend that a subsequent (phase 2) project be contracted that will develop these systems and associated tools that growers can use to help them consistently meet or exceed the standards. These systems and associated tools can help provide solutions to the wide range of issues that are causing the current low compliance of Australian melons, such as climate, growing region, harvest window and crop monitoring. Transport does not affect Brix, but poor transport has resulted in consignment rejections at distribution centres.

The phase 2 project should be more than an extension project. While the industry now has an updated set of maturity standards, growers still need a set of tools and sampling protocols to monitor and manage Brix development and variability. These should be developed during the phase 2 project. The phase 2 project should also assist the supermarkets to adopt the new standards and develop protocols for them to assess fruit quality when they receive it.

The monitoring results indicate that melon quality is lowest in winter. The phase 2 project should investigate the reasons for this and develop solutions to ensure that all melons meet the minimum maturity standards all year round.

What is obvious from the monitoring results is that honeydew melons are barely meeting existing standards let alone the new ones. There are clearly some good fruit available, but not enough. The next project should investigate the reasons for this and develop solutions to ensure that honeydew melons meet the minimum maturity standards all year round.

## Refereed scientific publications.

None to report.

## References

Barker, L. & Ledger, S., 2007. Watermelon Quality Guide. Queensland Government Department of Primary Industries and Fisheries. Job Number 2102.

Barker, L. & Ledger, S., 2007. Rockmelon Quality Guide. Queensland Government Department of Primary Industries and Fisheries. Job Number 2103.

Peryam, D.R. & Pilgrim, F.J. (1957) Hedonic scale method of measuring food preferences. Food Technology. Vol XI, No 9.

## Intellectual property

No project IP or commercialisation to report.

## Acknowledgements

Delytics wishes to acknowledge and thank:

- All project partners: Rudge Produce Systems, the Consumer Sensory Team at the Queensland Department of Agriculture and Fisheries (QDAF) and Melons Australia management and Board. The sterling efforts made by each of these organisations went above and beyond their initial remit to advance the project and accommodate changes.
- Jon Brewer of AusMarket Consultants in Brisbane who went out of his way to make sure that the QDAF sensory team

had enough fruit of the right quality at the right time for their taste panels.

- The melon growers who supplied the project with fruit at very different maturities than they would normally provide to the market. This was very important because the taste panels required a wide range of fruit maturities, beyond what would typically be available in the markets.
- The members of the Project Reference Group for their support and valuable insights.
- Kathryn Young of Hort Innovation for her ongoing support during this very important project.
- Johnathon Davey of Melons Australia for working hard to ensure the Board was well informed, for arranging fruit for the taste panels, and for supporting the project and its team to the growers, Board, and wider industry.

## Appendices

None



16 February 2024

Australian Melon Association Inc  
Email: [execofficer@melonsaustralia.org.au](mailto:execofficer@melonsaustralia.org.au)

ABN 36 990 325 012

Phone: 0407 032 023

*Working together to build a successful future for the Australian Melon Industry*

---

Dear Mark

Please see below the results and data from visits to the Melon Quality pages via the Melons Australia website.

It's great to see that the Melon Quality Project landing page which detailed information about the project and its objectives, along with the live Delytics report had 42 users with 137 event counts (clicks on report link, page loads, page scrolls).

As you can see, the Melon Quality webinar also had a substantial amount of users and event counts.

	Users	Event Count
Melon Quality Project landing page	42	137
Melon Quality Project Article on News page	19	
Melon Quality Webinar	30	76

\*\* A user represents a single person who has visited the website page.

\*\* An event count is a user interaction with the website page.

Please let me know if there are any questions, and we look forward to continuing to promote this important data source to our growers and broader supply chain partners.

Yours sincerely

Johnathon Davey

Executive Officer - Melons Australia