Final Report

Improving quality of sweetpotato across the industry supply chain

Project leader:

Tristan Kitchener

Report authors:

Tristan Kitchener, Andreas Klieber

Delivery partner:

Quality Associates

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PW20000

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Improving quality of sweetpotato across the industry supply chain (PW20000)

Disclaimer:

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Level 7
141 Walker Street
North Sydney NSW 2060

Telephone: (02) 8295 2300

www.horticulture.com.au

Public summary

This project aimed to improve the quality of sweetpotatoes across the industry by engaging key stakeholders across the value chain including growers and retailers so quality could be monitored and maintained in the long term. As the 'Australian sweetpotato consumer insights research (PW18003)' project found, quality is a main driver for consumer purchase for 63% of respondents. Key quality concerns raised related to sweetness, fibrousness, appearance, firmness and colour.

To achieve this, this project investigated pre and postharvest quality issues for Australian sweetpotatoes and developed a business case for quality improvements in the supply chain. This was developed through supply chain quality reviews on farms in Queensland and at the retail level in Victoria, mimicking a typical supply chain.

Industry adoption of the recommendations was driven through direct engagement with supply chain stakeholders, newsletters and grower roadshows. The program also monitored the adoption of these recommendations by industry, particularly the major retailers.

Two key parties and service providers that have collaborated to deliver this project include Kitchener Partners (Tristan Kitchener) and Quality Associates (Dr Andreas Klieber).

Keywords

Sweetpotato, supply chain, dehydration, Consumer satisfaction, quality, skinning, alignment, retailers.

Introduction

This project aimed to improve the quality of sweetpotatoes by engaging key stakeholders across the value chain including growers, wholesalers, processors and retailers so quality could be monitored and improved.

As the *'Australian sweetpotato consumer insights research (PW18003)*' project found, quality was a main driver for consumer purchase for 63% of respondents. Based on this research (see below) there was a significant opportunity to shift 'medium users' (45% of the sample) of sweet potatoes toward doubling their consumption. This group was heavily impulse purchase driven and quality significantly impacted their purchase behaviour. 'Light users' could also be influenced to increase purchase, mainly by improved product knowledge. A small shift in consumer purchasing frequency in these two consumer segments could double consumption by these consumers.

The aim of PW20000 was to drive consumer purchasing by focussing on industry adoption of key quality measures, and the project used information from *Project MT17017 Vegetable cluster consumer insights program* (and any related project post MT17017) and *Project HN20001 Horticulture consumer sensory profiling* to identify specific consumer insights to assist with identifying opportunities for quality improvement.

Methodology

Given the dominance of the major retailers, namely ALDI, Coles and Woolworths, and the strong relationships that the Project Team has with these stakeholders, the intention was to partner closely with these businesses to garner their support and access to their historical and current QC inspection and customer complaints data. Similarly, the intention was to garner the support of the grower base through a thorough explanation of the project objectives and benefits of working together to improve on-shelf quality.

A whole-of-industry approach was critical to initiate a behaviour change and targeting both retailers and growers allowed the Project Team to use a push-pull strategy. This involves a grower 'push' and a retailer 'pull', thereby enabling the whole supply chain to adopt the proposed changes and understand the benefits of an aligned industry approach.

Project Planning, Management and Governance

A project plan was developed detailing the key activities, milestones and outputs over the duration of the project. In addition, a Project Reference Group (PRG) was established to provide input and feedback to continuously improve the project activities and to de-risk activities. This included the Hort Innovation Project Manager, as well as industry experts from key growers and major retailers.

Given the sensitivities of bringing major grocery retailers together, clear competition governance procedures, as provided by Hort Innovation, were used to ensure there were no competition concerns.

Stakeholder Engagement and Alignment

It was essential that all stakeholders understood the aims of the project and were willing to support the project recommendations. This was achieved through a combination of direct engagement with major retailers and the key growers within each growing region. Meetings were initially conducted 1:1 to allow any issues or barriers to be identified and resolved. In addition, to engage the broader supply chain, updates for the industry were published through established communication routes (the ASPG newsletter), particularly to reach growers.

Supply Chain Mapping and Source Investigation

To fully understand the sweetpotato supply chain, interviews were conducted to understand the product and postharvest systems with key supply chain members within each of the main growing regions. This included identifying key pain points within the supply and likely root causes of quality issues (which were then correlated with the historical retailer QC Inspection and Customer Complaints data). More specifically, the following activities were completed:

- *Key Growers and Supply Chain Stakeholders*: The PRG helped to identify key regional growers and distribution businesses.
- *Supply Chain Mapping*: Phone interviews were conducted with the identified parties to map out the key sources and logistics routes to identify supply chain variabilities and time taken from farm to retailer shelves, including potential delays and any seasonal factors for the key regions (Bundaberg, Lockyer Valley and Atherton Tablelands, and the key NSW growing region).
- *Supply Chain Data*: With retailer support, data loggers (Escavox) were sent with selected shipments to measure temperature profiles during distribution, with c. 1,000 loggers used over the course of the season, from different supply regions to different retailers, across all states.

These activities helped to identify key pain points within the key supply chains impacting quality and garner buy-in and support of key sweetpotato supply chain stakeholders to support the Quality Improvement Plan (QIP).

Access to Historical Retailer Quality Data

The project team leveraged relationships with the major retailers to access historical Quality Control (QC) inspection data and Customer Complaints data for the sweetpotato category, extending back for up to 3 years. This data helped to identify the key quality rejection reasons at DC and also the main quality reasons for

complaints by consumers. Data was deidentified before any communication of project-related information. To achieve this, the following activities were completed:

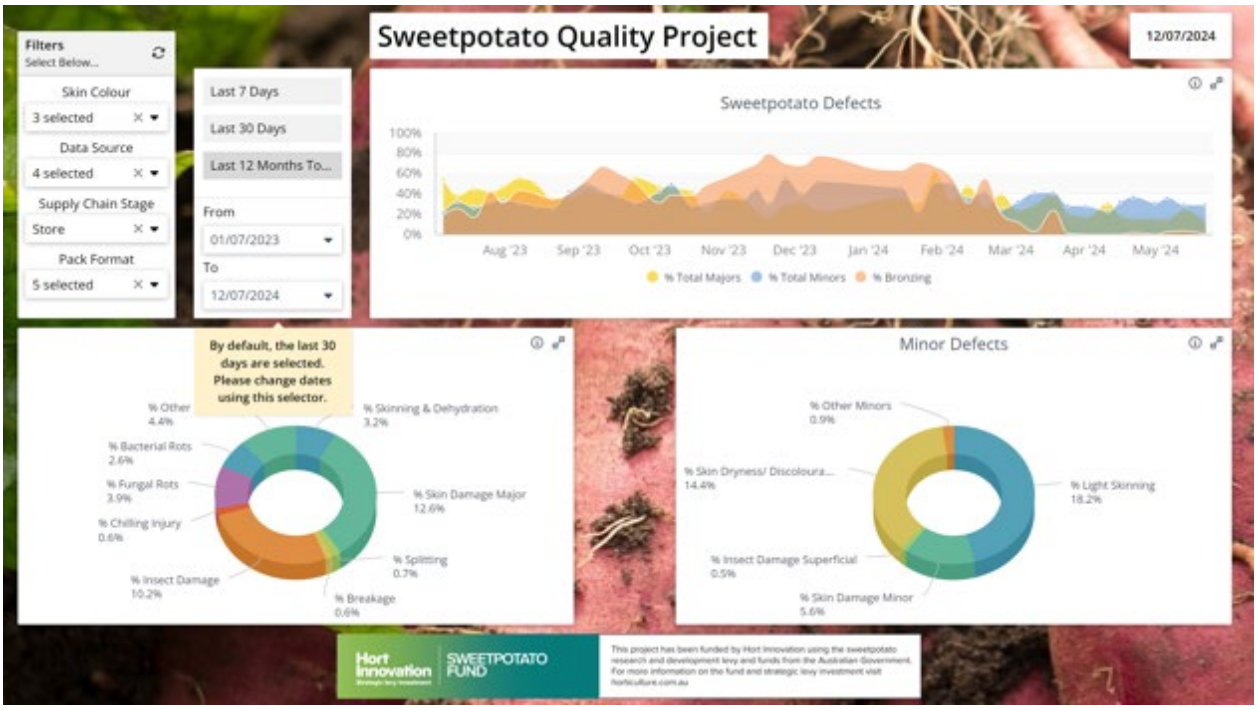
- Meetings were held with each retailer's Head of Produce Technical and Category Buyer (commercial) to explain the project objectives and benefits of sharing QC inspection and customer complaints data.
- Customer Complaints data was provided by the retailers, and using the Customer Complaints Per Million Units (CPMU) the relative impact of the different quality defects was weighted.
- Confidentiality Agreements were put in place with each major retailer to confirm data was de-identified and aggregated across all retailers without compromising confidentiality.

These activities helped to identify the key pain points within the key supply chains impacting quality.

Retailer Engagement and DC Inspection Data

To complement the historical data provided by the retailers, real-time data from retailers was used to identify current quality issues. This process involved:

- The project team engaging directly with the ALDI, Coles and Woolworths technical and commercial teams to brief them on the project and to secure access to the retailers' Distribution Centre (DC) produce inspection reports.
- Reviewing retailer sweetpotato specifications and specification variations across the year.
- Collating DC quality data through a central, dedicated and secure email address and with all data de-identified by the program team.
- Data was processed weekly and combined with aggregated data collected at the retail store level.
- De-identified data was available to the sweetpotato industry and individual retailers through a secure online data portal (see screenshot below) as well as a weekly report emailed directly to each retailer (see example in Appendix). Stakeholders were also to see their own data and de-identified industry data.
- Data collected over time was used to determine overall quality issues and the development of the Quality Improvement Plan. Objective and quantifiable data was a vital tool to motivate a behaviour change by the key stakeholders, particularly the retailers.



In-Store Quality Monitoring and Assessment

To complement the retailer QC inspection data, in-store quality inspections were conducted within ALDI, Coles and Woolworths. This activity was conducted in Melbourne since this was the longest supply chain (apart from WA) and therefore could be considered a worst-case supply chain in regard to the likelihood of quality defects. The project team were located in Melbourne, which helped to minimise travel and operational costs. The specific activities included:

- The project team visited 1 store per retailer (ALDI, Coles, Woolworths, 1 Independent) in Melbourne, selecting a different store each week, and conducted a visual inspection of on-shelf quality issues.
- Overall quality on display was evaluated in relation to the quantity of stock on show and relatively weighting of key quality issues.
- Data was processed weekly and combined with data collected at the DC level through QC inspections.
- De-identified data was made available to the sweetpotato industry and individual retailers through a data portal as well as brief weekly reports.
- Data collected over time was fed into an overall identification of quality issues and development of the QIP.

Quality Improvement Plan

The data collected from all sources (historical retailer inspection and customer complaints data, retailer QC inspection in DCs, in-store monitoring, supply chain mapping analysis and Project Reference Group (PRG) guidance) was used to develop the industry roadmap in the form of a Quality Improvement Plan (QIP). Feedback and input were also provided by the Project Reference Group.

The report was shared with the wider sweetpotato industry, through grower roadshows and the industry newsletter and detailed the key challenges and solutions for improving the quality of Australian sweetpotatoes.

Industry Engagement through Grower Roadshows

To ensure the continued support of the wider supply chain it was important to ensure the entire supply chain understood the overarching project objectives and their collective responsibility to improve quality to maximise sales and demand of sweetpotatoes.

Growers were encouraged ('pushed') to adopt the QIP. This was driven by the Project Team, utilising the support of the industry PIB and PRG. Since grower members of the PRG have close relationships with growers, they were well placed to gain the trust and support of growers to implement and adhere to the QIP.

The main communication to growers was through Grower Roadshows, as well as industry communication through newsletters, existing industry communication channels and Hort Innovation.

The major grocery retailers collectively account for the majority of sweetpotato volume by sales value. This means they were an effective and efficient means to drive behaviour change and provide the required 'pull' for the industry through the key domestic producers. The retailers were an important group of stakeholders given the influence they have over producers, so it was vital to 'help them to help us' by ensuring they were making good quality decisions based on sound facts and information.

The Project Team have good relationships with all the major retailers across the different internal functions (buying, technical and store operations) and at different levels within each organisation. These relationships helped gain access to key decision-makers within the retailers to understand any specific issues or needs and quickly resolve them.

The objectives of the roadshows was to align the industry on:

- A common understanding of potential quality issues and how to resolve these; and
- Agreement to manage quality consistently for the benefit of the industry as a whole, growing the 'pie' for everyone.

Since there are approximately 30-50 active sweetpotato growers in Australia, located primarily in QLD (76%), and particularly within Bundaberg, Lockyer Valley and Atherton Tablelands, followed by NSW (19%), the PRG suggested conducting grower roadshows in Tweed (NSW) and Bundaberg (QLD). These were held once a year during the winter months when the growers were more available (to maximise attendance).

Industry Communication to Aid Engagement and Adoption

All communication and industry engagement was aimed at driving best practices across the supply chain from growers through to retailers, and focused upon education and support to drive a positive culture focused on meeting the QIP and increasing the consumption of and demand for Australian sweetpotatoes.

Realtime Temperature Monitoring of Supply Chain

On the premise that variance in temperature and time can cause quality damage, the Project Team partnered with Escavox, a company that specialises in real-time monitoring of temperature in the fresh food supply chain.

The Escavox platform is a combination of hardware (IoT devices) and Artificial Intelligence analytics and reporting and alerting functionality that provides real-time data. The Escavox platform has been used by industry bodies to conduct quality analysis of fresh products in the supply chain. These include the Australian Mango Industry Association (AMIA) and the Meat and Livestock Association (MLA), results that have been published to quantify the impact of poor chain controls.

Temperature loggers (via Escavox) were used to monitor key supply chains, working with 5-6 key growers. This helped to identify areas in the supply chain that caused the greatest quality impacts.

Results and discussion

The key components of the results were:

Project Planning, Management and Governance

In line with the project plan, which detailed the key activities, milestones and outputs over the duration of the three-year project, a Project Reference Group (PRG) provided input and feedback to continuously improve the project activities, with the aim to de-risk activities and ensure the objectives of the project were met in full.

Milestone Reports were provided as per the project contract with input and guidance provided by the Hort Innovation Project Manager.

PRG meetings were held every 6 months, with minutes issued after each meeting.

Stakeholder Alignment

Meetings were held with all Retailers every season. These included a review of the project activities, prior 12 months quality performance and explanation of upcoming activities. This ensured that all stakeholders continued to adopt and support the Quality Improvement Plan and understood the intent of the project and how it provided benefit to their business or sector, and also that they understood the concept that improving customer satisfaction will benefit all stakeholders in that 'a rising tide lifts all boats'.

Each of the project's key activities will be discussed in turn, in line with the project methodology:

In-Store Quality Monitoring

In-store quality monitoring was a key activity to provide specific feedback to individual retailers regarding their on-shelf quality. In-store quality monitoring was conducted weekly in each retailer's stores for key varieties (gold, white and purple, as well as loose, pre-packs and organic).

The objective was to reduce the incidence of poor-quality products reaching the retail DCs, which would then be rejected and subsequently end up in the Central Markets. Ultimately, this product would be heavily discounted and reach consumers leading to a dissatisfactory experience, thus eroding the reputation of Australian sweetpotatoes.

Encouraging the industry to take a collective responsibility to self-police compliance in line with the QIP and understand the impact to all stakeholders if poor quality products reached consumers, worked well. Increasingly, retailers and producers reached out to the Project Team with questions relating to seasonal quality issues.

Grower Roadshows

Grower Roadshows were held once a year during the winter months. In each roadshow, the results of the prior year's performance were explained, followed by a Q&A. The aim was to aid understanding and encourage adoption and support for adhering to the QIP. Roadshows were held in Tweed and Bundaberg for each year of the project.

Growers from the PRG attended the roadshows and this helped to demonstrate the aligned industry approach for supporting the adoption of the QIP, and therefore the need for *all* growers to also work to the standards.

Industry Communication to Aid Engagement and Adoption

All communication and industry engagement, including Newsletters (see Appendix), was aimed at driving best practices across the supply chain from growers through to retailers, focusing upon education and support to drive a positive culture focused on meeting the QIP for Australian sweetpotatoes. This helped to drive accountability across all stakeholders to focus on quality and ultimately the goal to increase the consumption of and demand for Australian sweetpotatoes through improving consumer acceptability.

Retailer Adoption and Support

Whilst the growers broadly understood their responsibility for harvesting best practices to reduce the incidence of skinning, the retailers were varied in their response and general support for the project, as outlined previously. This is discussed further under Outputs.

Outputs

The quality monitoring data was used to help growers, retailers and the broader supply chain understand the benefits that could be provided by adopting the quality improvement roadmap (see Appendix) that was developed as part of the project, and aid understanding and buy-in. The key objective was to drive a sustained behaviour change across the entire industry. Key outputs are detailed in the Output Table below.

Output	Description	Detail
Sweetpotato Quality Improvement Plan and Roadmap	The Quality Plan and Roadmap is a key component of the project to allow growers and retailers to understand sweetpotato quality gaps and how to address those.	The Quality Plan and Roadmap was developed and refined over the initial 2 years of the project using retailer DC data, in-store monitoring and grower to DC data logging of temperatures. The Quality Improvement Plan and Roadmap were discussed and approved by the ASPG and growers at workshops in Bundaberg and Tweed and socialised with the retailers individually for support. See additional information below.
Grower and Retailer Meetings	Meetings were held with all retailers individually and growers in roadshows in Bundaberg and Tweed. Additional input from key growers was provided through the PRG meetings.	Minutes and follow-up actions were circulated to all attendees (and a Hort Innovation representative attended some meetings).
In-Store Monitoring	In-store maturity monitoring was conducted weekly.	All data was displayed in the weekly retailer and grower summaries and on the online ClicData portal (see screenshot on page 5) (with secure password access).
Retailer DC Monitoring	The DC inspection data where provided by the retailers was collated.	All data was displayed on the online ClicData portal see screenshot on page 5) (with secure password access).
Cold Chain Datalogging	Intensive cold chain data logging was carried out from key growers to a wide variety of retailer DCs and stores.	The data logging trial identified contributing factors to poor quality outcomes for sweetpotatoes in stores and assisted in the development of the Sweetpotato Quality Improvement Plan.
Industry communication	Articles in the industry ASPG newsletter (see Appendix).	See additional information below.

Key Meetings and Activities

There was a steady stream of engagement with the full supply chain and the major retailers, key producers, Hort Innovation representatives and the project team, as necessary. PRG meetings were held approximately every 6 months.

Retailer Engagement

Maintaining engagement with all three retailers was challenging, since the retailers consider sweetpotatoes a niche category and tend to focus more on the larger categories such as potatoes, onions and pumpkin. In addition, turnover of retailer staff made engagement harder. Key points to note are:

- Throughout the project Weekly Performance Benchmarking results were being issued to retailers (and industry) with reasonable engagement and follow-up with retailers, demonstrating their support for the project and desire to improve on-shelf quality and consumer acceptance.
- The Quality Improvement Plan was widely circulated and Quality Flyers (see Appendix) were developed for the retailers' DCs and Stores to focus on quality improvement.
- Retailer(s) agreed to delist the composite product line, which often led to poor quality on the retail shelf (since composites were often mixed in with premium specification products).
- Some retailers felt that on-shelf quality was acceptable, and that the reduced demand for sweetpotatoes was a function of consumers preferring to buy other products.

Quality Improvement Plan

One of the key deliverables of the project was the Quality Improvement Plan, which detailed the quality defects, improvement pathway and relative impact (high/medium/low) for gold, purple, white, pre-pack and loose products, as well as defects that were common to all products and pack formats. It also detailed the quality improvement actions that should be undertaken by each stage of the supply chain.

The QIP was discussed at the PRG meeting on 23rd November 2022 and signed off as approved, and then circulated to all stakeholders and presented to retailers in the retailer meetings in mid-2023. In these meetings, the retailers requested Store and DC Flyers to be used as the vehicle for communicating with and educating their staff. The PRG confirmed that the focus for growers should be on skinning, and this was taken up by PRG and ASPG members (it was agreed not to produce a flyer for growers, since more hands-on support was necessary and could be provided by the PW21002 Causes and management strategies for skin loss in Sweetpotato Project team).

The aim was to encourage each part of the supply chain to understand that there is a shared responsibility in improving on-shelf quality and customer experience, to build demand and consumption of sweetpotatoes, with each part of the supply chain doing its bit. The main focus for growers was to reduce skin damage and skinning (which leads to dehydration) and for retailers to focus on stock management in-store and correct temperature management.

Measuring the Success of the Quality Improvement Plan

Within the QIP, recommended actions were detailed for each stage of the supply chain, particularly growers and retailers. Market agents were a harder group of stakeholders to influence, due to their propensity to disintermediate relationships between growers and retailers to drive their own competitive advantage.

The ultimate gauge was to see an improvement in in-store quality through the weekly monitoring, ideally leading to an increase in consumption and demand for sweetpotatoes, however, there were a number of other variables, outside the scope of what this project can control, that affected the final outcomes and quality issues were prevalent throughout the duration of the project.

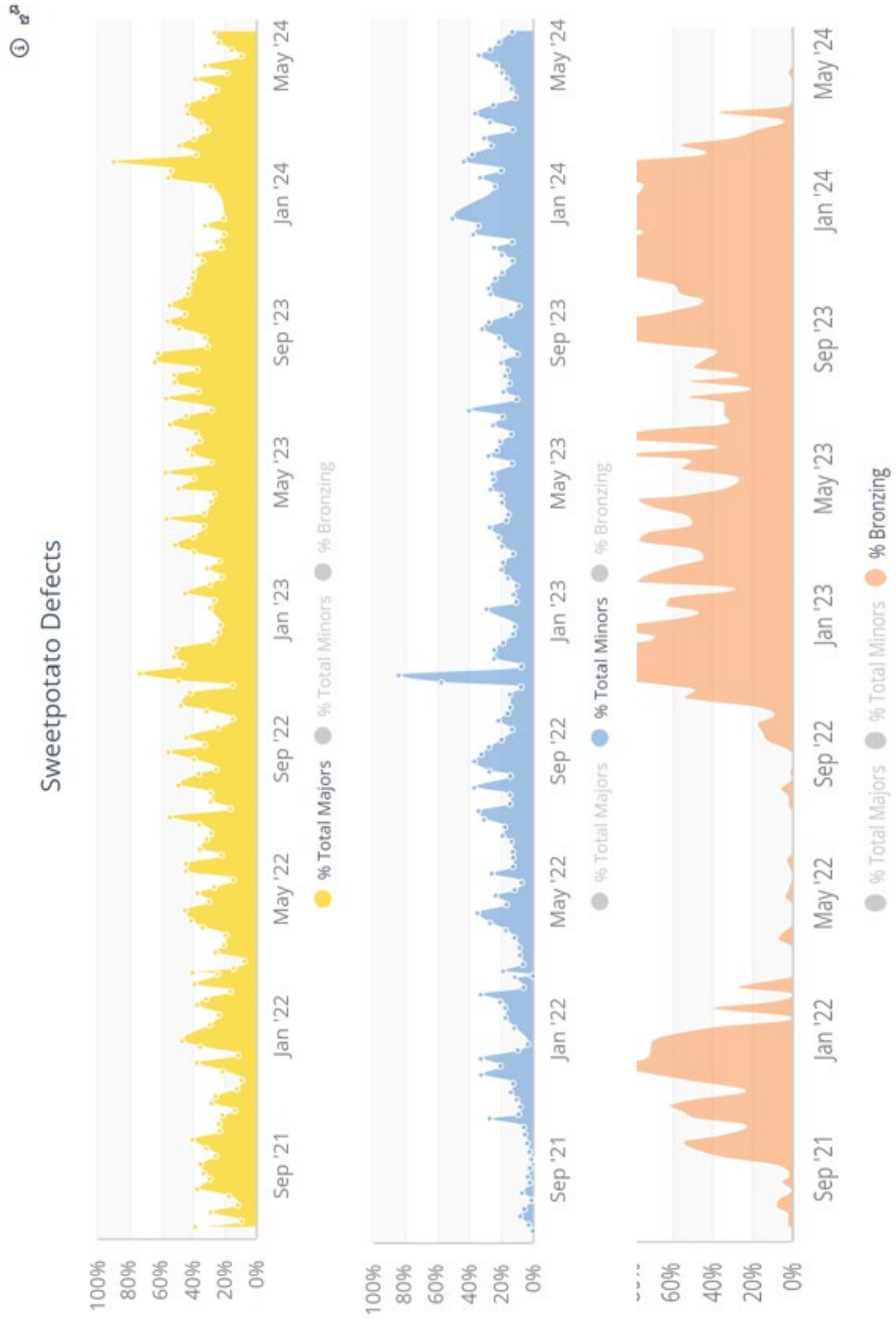
Weekly Performance Benchmarking

Weekly performance reports were sent to ALDI, Coles and Woolworths Buying and Technical Teams (and the PRG growers), de-identified to protect confidentiality. The quality reports detailed major and minor defects, in line with the retailers' specifications. Results were published online (in ClicData) with new results updated within 24 hours of collection.

Each retailer was provided with a weekly summary of their performance, as well as a secure password to access the ClicData platform to assess how their performance compares to the industry average. Discussions were held regularly with supermarket buyers, category managers and product technologists as necessary to explain the results and answer questions.

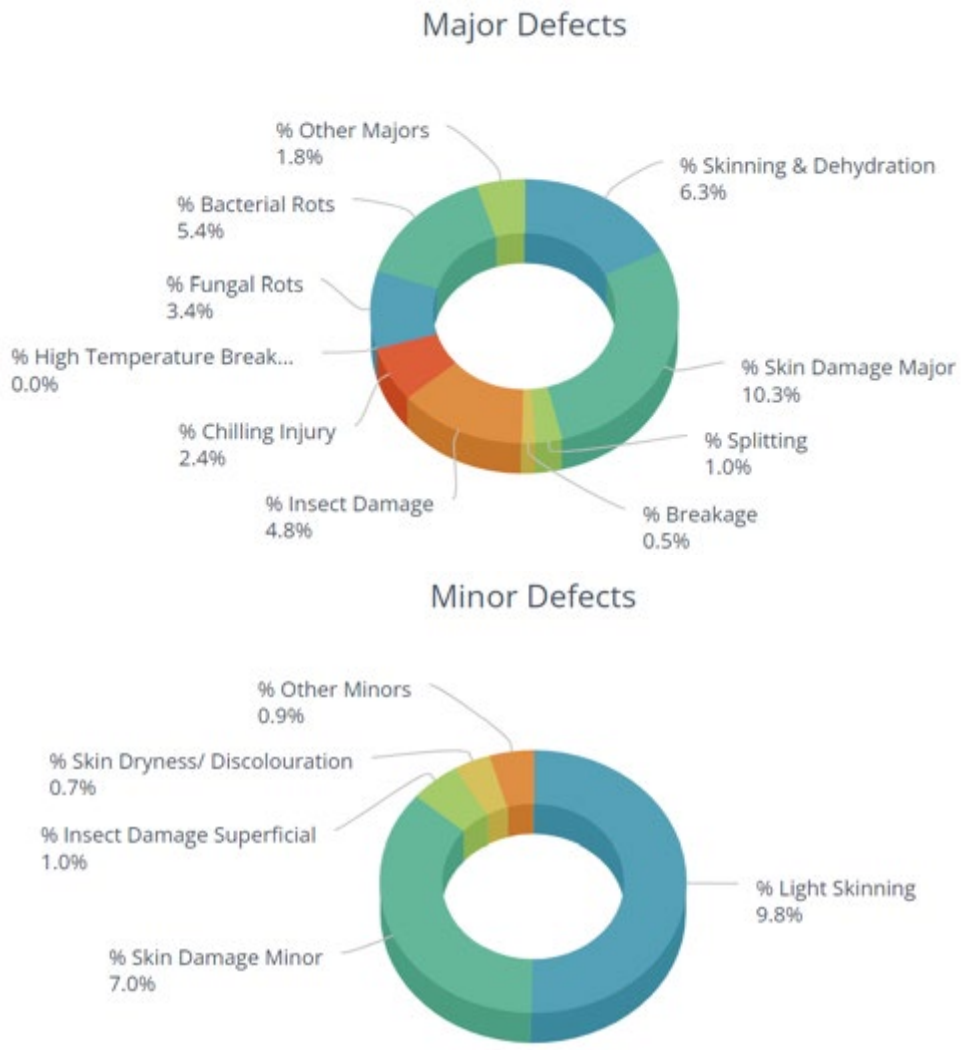
The overall trend in the quality of sweetpotatoes was that had not significantly improved over the last 2.5 challenging years (see Figure 1). Some issues actually became worse, particularly bronzing which continued throughout the year compared to year 1 where it did not occur for half of the year. This was likely linked to the harvesting of older crops.

Figure 1: Example quality performance of sweetpotatoes over 2.5 years (gold-skinned loose)



Nearly half of the defects observed for the main crop (gold-skinned loose sweetpotatoes) were due to skinning and skin damage, followed by mould development on cut ends and chilling injury (Figure 2).

Figure 2: Major and minor defects for loose gold-skinned sweetpotatoes July 2021 – Jun 2024



Access to DC Inspection and Quality Data

Inspection data showed that sweetpotatoes were not a high-focus product line for retailers due to their niche status and (mistaken) belief that they can be handled as a potato, held at low temperatures and infrequently rotated on-shelf. Growers overall would like to see more inspections to occur to enforce specifications.

To help the retailers understand the importance of proper stock rotation and on-self management, the Project Team engaged with the retailers to investigate stock rotation, storage temperature and specification issues and has drafted store and DC guidance on handling and inspection of sweetpotatoes.

Retailers were also approached for in-store waste data, but this was not shared with the Project Team.

Updates through the Australian Sweetpotato Growers Association

Close contact was maintained with the ASPA via their Executive Officer, Peter Long. This included facilitating relationship building between Peter and industry stakeholders and contributing to ASPA meetings as necessary.

Outcomes

The project used a push-pull strategy. This involved a grower 'push' and a retailer 'pull', thereby enabling the whole supply chain to improve quality and understand the benefits of an aligned industry approach. Growers were encouraged ('pushed') to improve quality. This was largely driven by the core group of PRG growers, who were well-placed to take on this role.

The three major grocery retailers collectively account for a large percentage of the domestic sweetpotato volume by sales value. This meant they were an effective and efficient means to drive behaviour change and provide the required 'pull' for the industry through the key domestic producers. The retailers were an important group of stakeholders given the influence they have over producers, so it was vital to 'help them to help us' by ensuring they were making good quality decisions based on sound facts and information. A 'rising tide raises all boats' and working with the major retailers was key to improving quality across the entire industry.

Tristan Kitchener (Kitchener Partners) and Andreas Klieber (Quality Associates) are ex-retailers and have good relationships with all the major retailers across the different internal functions (buying, technical and store operations) and at different levels within each organisation. This helped to understand any specific issues or needs that retailers had and to quickly resolve them.

The specific outcomes of this project for the sweetpotato industry, as per the RFP were achieved as shown in the following Output Table.

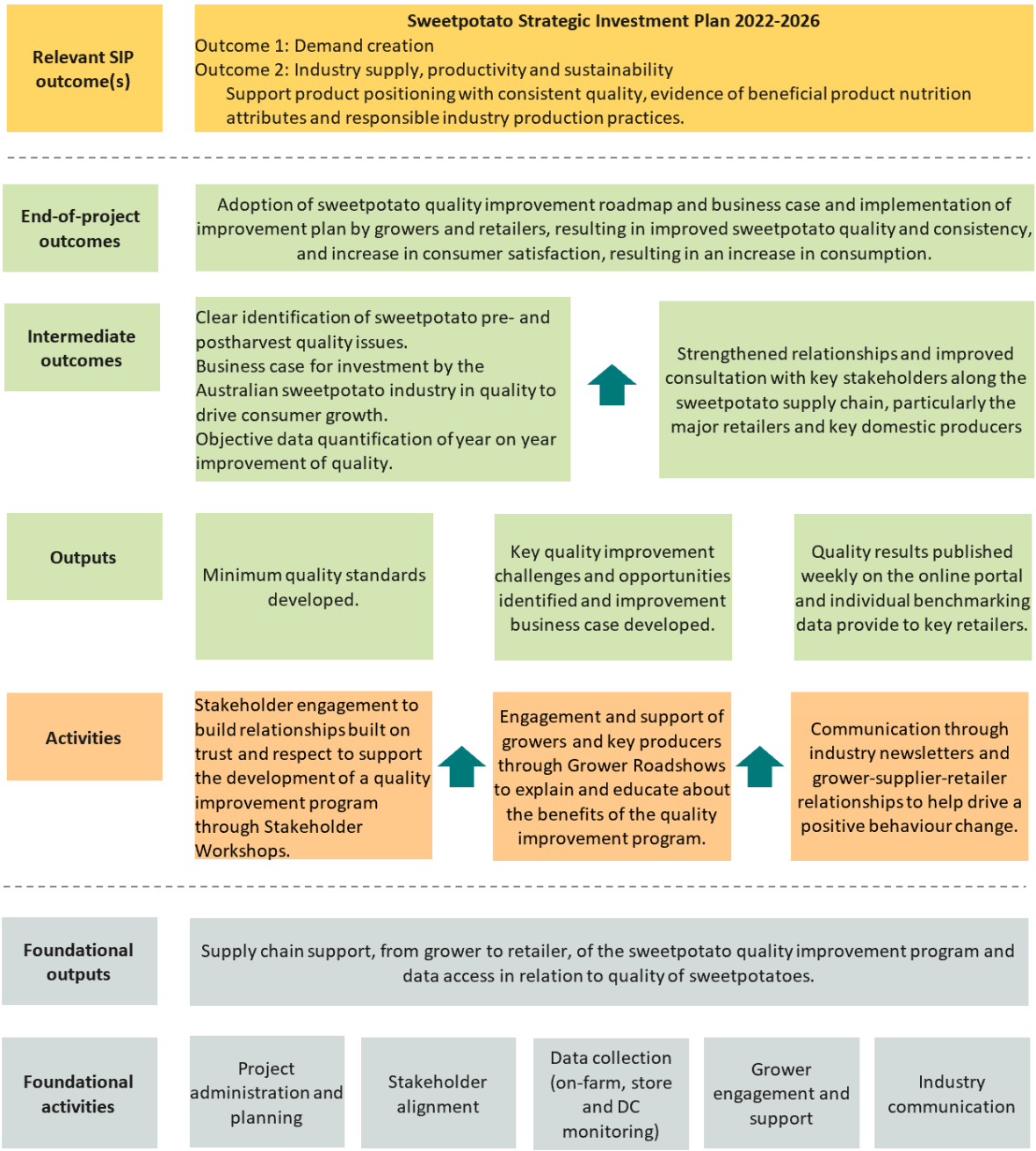
Outcome	Alignment to fund outcome, strategy and KPI	Description	Evidence
Clear identification of sweetpotato pre- and postharvest quality issues throughout the supply chain, with a report of quality issues observed and the quantification of impacts.	This outcome was closely aligned with the sweetpotato industry development goals: • Increase industry alignment with quality and brand positioning opportunities driven by consumer insights.	The project obtained quality-related data from stores and DCs. This was discussed in detail with key growers and the participating retailers to identify the causes and impacts of quality defects.	Quality was monitored through the weekly in-store monitoring and DC inspection data. Data was gathered and presented through the data portal and weekly reports. The data was also utilised to develop the Sweetpotato Quality Improvement Plan and Roadmap.
Support for investment by the Australian sweetpotato industry in quality to drive consumer growth, with prioritisation of the most significant quality issues for improvement and development of a quantified business case for industry adoption.	This outcome was closely aligned with the sweetpotato industry development goals: • Increase domestic consumer demand for fresh Australian sweetpotatoes through improving knowledge, attitudes and purchase intent. • Increase industry alignment with quality and brand positioning opportunities driven by consumer insights.	The quality data was used to develop a Sweetpotato Quality Improvement Plan and Roadmap. Key issues were quantified and discussed with growers and retailers to rate relative consumer impact and the priority of addressing each of these.	Completion of the Sweetpotato Quality Improvement Plan and Roadmap.

Objective data generated and analysed to show the sweetpotato industry's progress in improving quality and customer satisfaction – quantification of year-on-year improvement of quality	This outcome was closely aligned with the sweetpotato industry development goals: • Increase domestic consumer demand for fresh Australian sweetpotatoes through improving knowledge, attitudes and purchase intent. • Increase industry alignment with quality and brand positioning opportunities driven by consumer insights.	Weekly quality monitoring was conducted to allow comparison of sweetpotatoes across seasons and the 3 years of the project.	Weekly reports to retailers and growers and housing of highly granular information on the Clic-Data portal.
Objective, longitudinal data generated and analysed at the retail level of sweetpotato quality over time. Data was deidentified – quantification of year-on-year improvement of quality	This outcome was closely aligned with the sweetpotato industry development goals: • Increase domestic consumer demand for fresh Australian sweetpotatoes through improving knowledge, attitudes and purchase intent. • Increase industry alignment with quality and brand positioning opportunities driven by consumer insights.	Weekly quality monitoring was conducted to allow comparison of sweetpotatoes across seasons and the 3 years of the project.	Weekly reports to retailers and growers and housing of highly granular information on the Clic-Data portal.
Provision of real-time quality data (deidentified) to the sweetpotato industry including retailers, growers, packers and marketing groups to assist in targeting high sweetpotato quality at all times to grow sales – the issue of regular reports and data provision through the bespoke data portal	This outcome was closely aligned with the sweetpotato industry development goals: • Increase domestic consumer demand for fresh Australian sweetpotatoes through improving knowledge, attitudes and purchase intent. • Increase industry alignment with quality and brand positioning opportunities driven by consumer insights.	Weekly quality monitoring was conducted to allow comparison of sweetpotatoes across seasons and the 3 years of the project.	Weekly reports to retailers and growers and housing of highly granular information on the Clic-Data portal.
Outreach to assist the sweetpotato industry in understanding and adopting best quality	This outcome was closely aligned with the sweetpotato industry development goals:	Grower roadshows were conducted in Bundaberg and Tweed to discuss quality data and to	Meeting minutes and actions arising.

practices – industry roadshows conducted as agreed and budgeted, information sharing through the ASPG website	• Increase industry alignment with quality and brand positioning opportunities driven by consumer insights.	develop and sign off on the Quality Improvement Plan and Roadmap. Additional meetings were conducted with individual retailers to assist with buying into the Plan.	
Evidence showing quality improvements of sweetpotatoes at the retail level associated with increased consumer satisfaction – quantified changes to quality output at the retail level comparing years 1, 2 and 3	This outcome was closely aligned with the sweetpotato industry development goals: • Increase domestic consumer demand for fresh Australian sweetpotatoes through improving knowledge, attitudes and purchase intent. • Increase industry alignment with quality and brand positioning opportunities driven by consumer insights.	Each year data was presented to the PRG, grower roadshows and retailers regarding the industry quality performance. Trends of defects over time were assessed, including any changes to different defects occurring in different seasons.	Presentations of industry performance and quality data to the PRG, growers and retailers.

Monitoring and Evaluation

The elements of the Program Logic Matrix were all achieved, apart from a clear increase in consumption. The Sweetpotato industry faced a variety of challenges during the project including low prices, excess volume in the market and consequent extended storage (in the field and by wholesalers) and quality defects. Together with some retailers not engaging constructively with the aims of the project meant that consumption did not increase.



The Key Evaluation Questions (KEQs) are discussed below.

Key Evaluation Question	Project Performance	Continuous Improvement Opportunities
Effectiveness: To what extent has the project increased the quality of sweetpotatoes?	The project developed a robust Sweetpotato Quality Improvement Plan and Roadmap. While clear paths of quality improvement were established and some were implemented, general industry conditions meant that quality did not improve overall in the project.	The industry may be able to improve skin quality, the major issue found in the project, by adopting the outcomes of the PW21002 Project funded by Hort Innovation.
Relevance: To what extent has the project met the needs of industry levy payers?	The project met the need of the industry to improve consumer acceptability and quality levels. Further work is needed though to consistently achieve the outcomes of the Sweetpotato Quality Improvement Plan and Roadmap.	Further industry and retailer focus is needed to achieve the desired quality outcomes and to grow consumer demand.
Appropriateness: How well have intended beneficiaries (growers and suppliers) been engaged in the project? Have regular project updates been provided through linkage with the industry communication project? To what extent were engagement processes appropriate to the target audience(s) of the project?	Regular road shows to meet with growers were well supported and received. Regular updates were also provided through industry publications. The engagement activities were specifically tailored to the growers or retailers in 1:1 meetings or grower roadshows to regional areas.	None identified.
Efficiency: What efforts did the project make to improve efficiency?	The project was set up to efficiently distribute the relevant information and set expectations. This included a data portal and weekly emailed reports.	None identified.

Recommendations

The key recommendations resulting from the project are detailed below.

- Since the retailers largely see sweetpotatoes as a niche category, it will be important for industry to take the lead and set the strategy, and then provide guidance and support to the retailers.
- The key insights and learning from the Quality Project should be reiterated to the retailers, including:

  Quality: the project has demonstrated that skinning is the key quality parameter that needs to be closely managed, and that temperature (chilling particularly) is probably not such a big issue. There are different quality issues throughout the year, including particularly bronzing due to holding of sweetpotatoes in the ground during oversupply periods. Industry should demonstrate actions being taken including, Grower Roadshows, the PW21002 project, grower flyers etc.

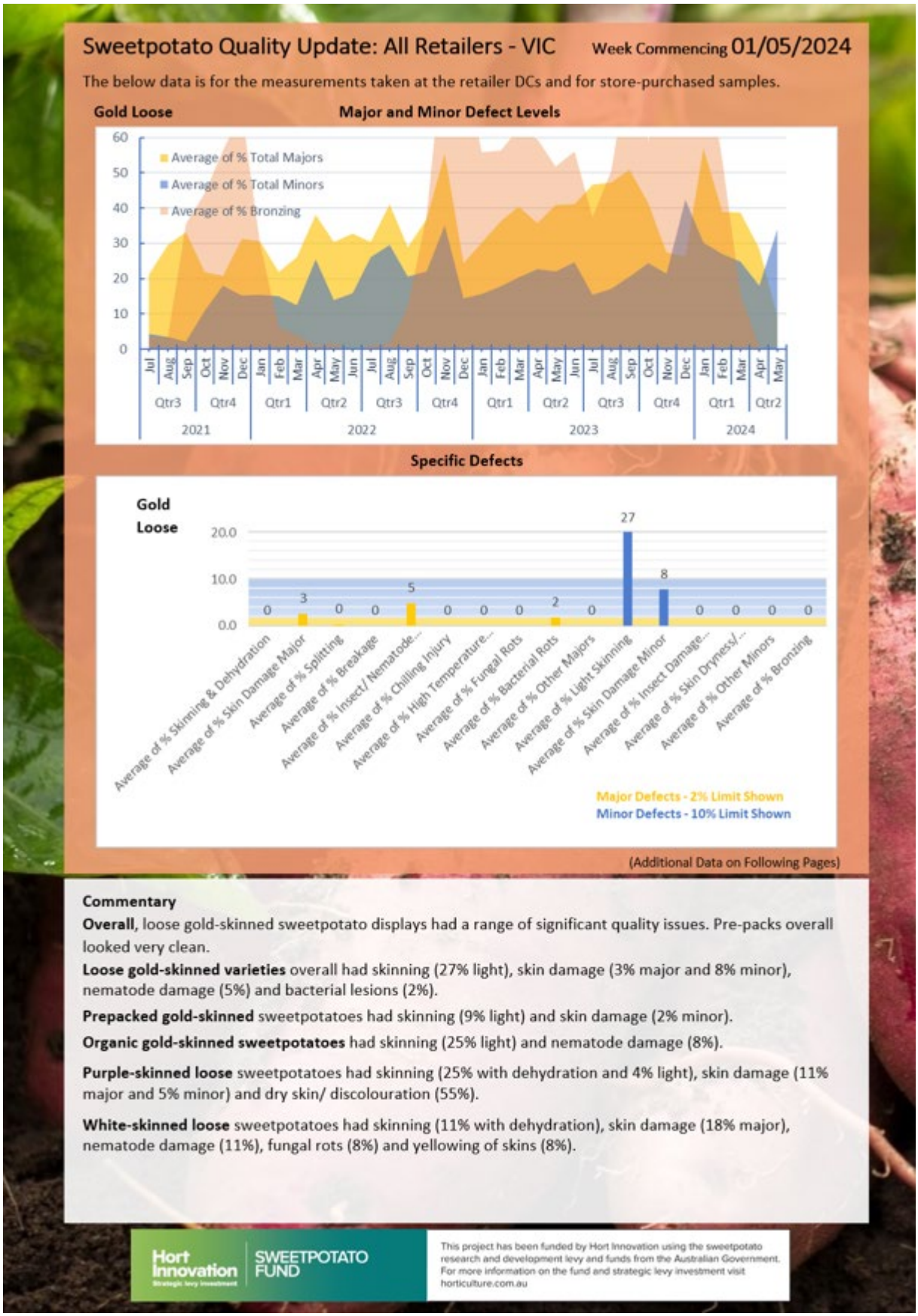
Stock Cycle Time: Whilst there is clear visibility of product handling at the grower and retailer ends of the supply chain, there is little insight to what happens with agents in the Central Markets. With the ebb and flow of seasons, it is likely that stock could be older than perhaps thought and close attention should be paid to supply through Market Agents and wholesalers.

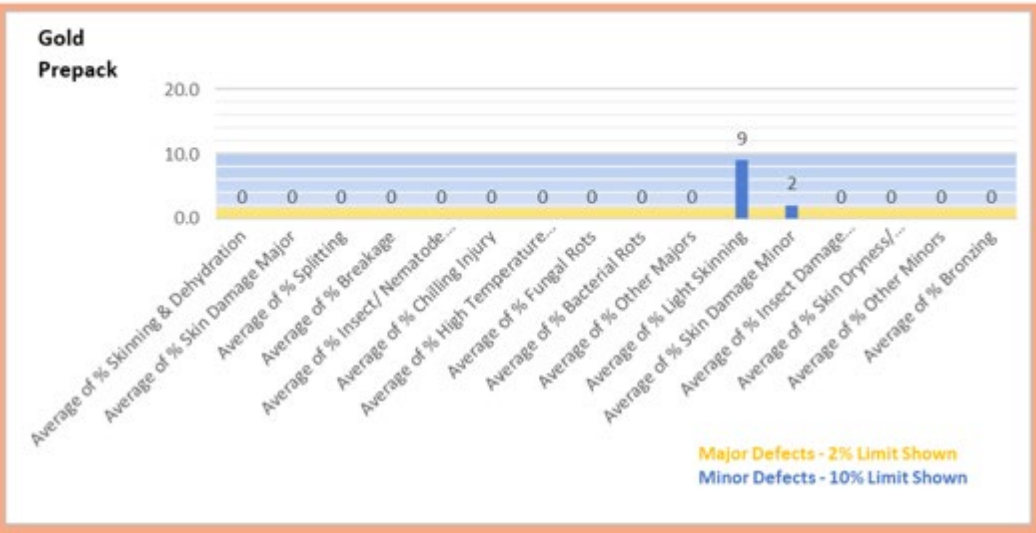
- The sweetpotato industry should investigate further levers to drive quality improvement at store level. This could involve looking at price elasticity to drive a higher sales velocity through retail stores, and consequently fewer quality issues developing.
- The PW21002 project currently underway will also assist growers in producing fewer skin quality issues which will result in better quality and less unsightly dehydration on shelf.
- Constant guidance and support should be provided to the retailers and attention paid to delivering collaborative relationships across all retailer functions, particularly buying and category teams, technical and DCs.

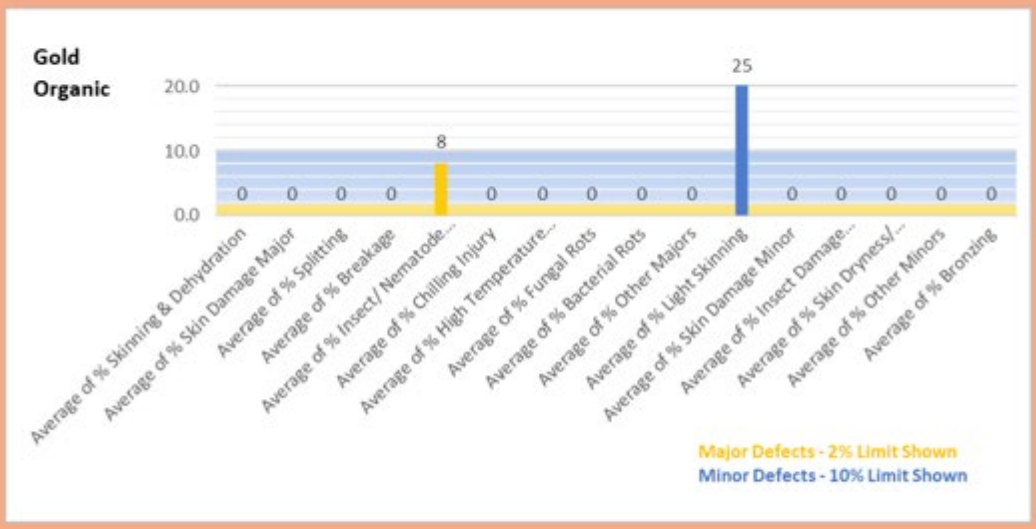
Intellectual property

No project IP or commercialisation to report.

Appendix 1 – Sweetpotato Report



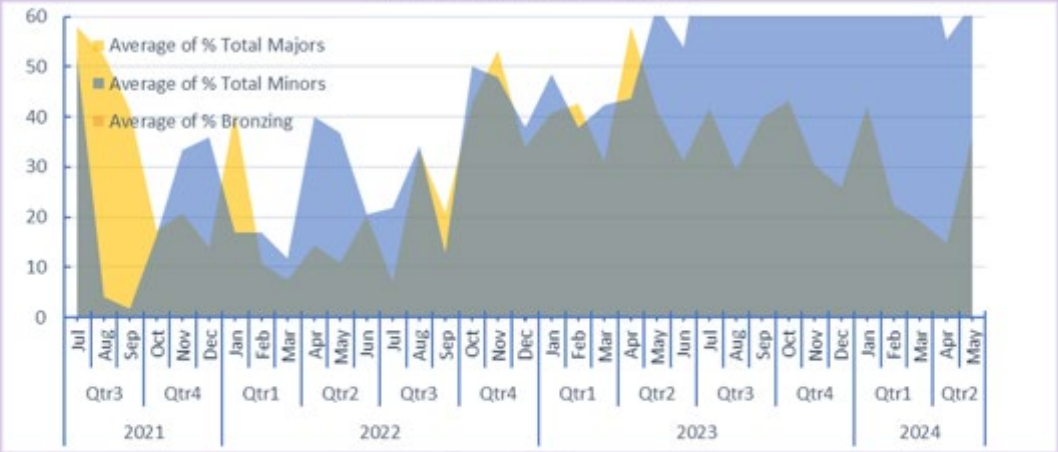




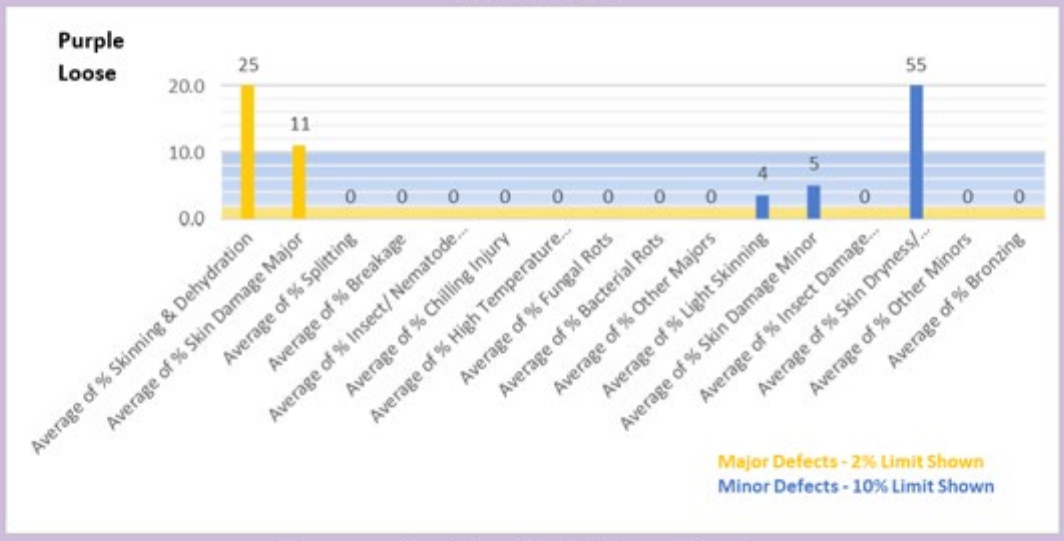
Images can be enlarged by clicking and dragging.

Purple Skinned

Major and Minor Defect Levels



Specific Defects



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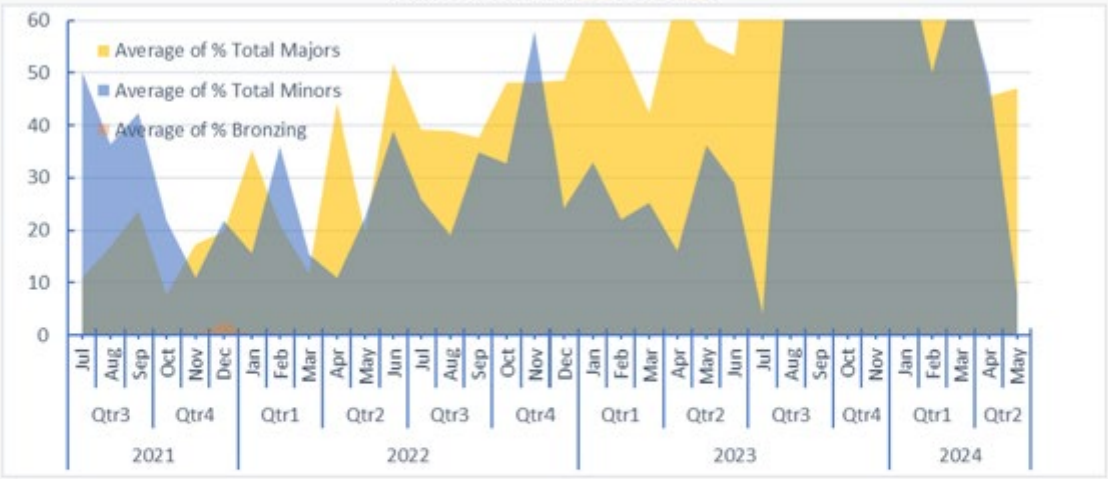
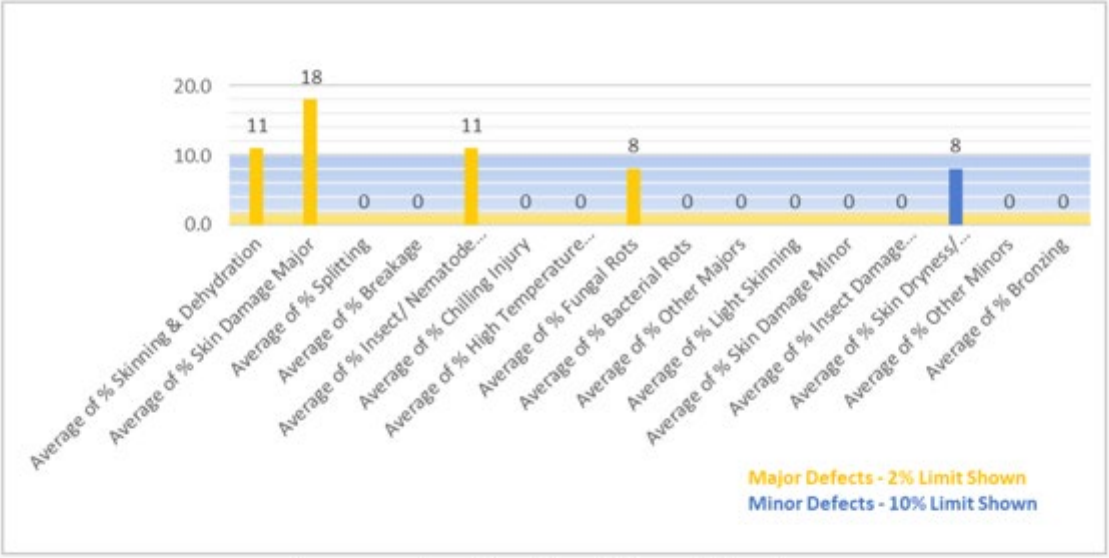
White Skinned

Major and Minor Defect Levels



Specific Defects



Images can be enlarged by clicking and dragging.

Appendix 2 - Quality Improvement Roadmap

Sweetpotato Quality Improvement Plan and Road Map

Tristan Kitchener (Kitchener Partners) and Andreas Klieber (Quality Associates)

19/12/2022

Summary

In 2021 the need to lift the quality of sweetpotatoes was recognised with the funding of a new project PW20000. A key deliverable of that project is a Quality Improvement Plan which was published in December 2022. The development of the Quality Improvement Plan follows 17 months of retail quality monitoring, supply chain data measurements and grower and retailer engagement which took place from 01/07/2021 to 1/11/2022.

This project aims to improve the quality of sweetpotatoes by engaging key stakeholders across the value chain including growers, wholesalers, processors and retailers so quality can be monitored and maintained.

A wide range of quality issues have been identified in store and in distribution centres. These are often caused by skin damage/ skinning, fungal or bacterial rots and temperature related stresses.

Data logging sweetpotatoes during distribution showed significant time delays, reducing shelf life, and high or low temperature abuse.

Issues were further exaggerated by dehydration and decay of sweetpotatoes on loose store displays.

The Sweetpotato Quality Improvement Roadmap identifies opportunities for the industry to reduce quality and financial losses and increase consumer uptake.

Elements identified for improvement vary by sweetpotato type, but also have some common elements. Improvement pathways have been identified for each major issue.

The key outcomes for the Sweetpotato Quality Improvement Plan will be to:

- Drive accountability across all key stakeholders (growers, wholesalers, major supermarkets) to focus upon on-shelf quality, resulting in greater consumer acceptability;
- Continue to drive best practice across the supply chain from growers to retail and drive a positive culture focused on high quality standards for Australian sweetpotatoes; and
- Build capacity and understanding for quality improvement across the supply chain, with regular feedback provided.

Quality Data and Issues Identified

1. Identification of Pre and Postharvest Quality Issues

During the observation period from 1/07/2022 to 1/11/2022, quality in stores was monitored for ALDI, Coles, Woolworths and Independents. The assessments were for displayed stock and varied from single touch ¼ full – 2 full crates of gold skinned loose products to displays of loose 150 tubers for each skin colour plus pre-packs.

Quality Assessment data from the retailers' DC inspections was also assessed for that time period.

Quality deterioration, particularly for skin marking defects, was worse than expected and is likely to be a purchase barrier for consumers.

The following data is based on % sweetpotatoes displayed in the 3 major retailers and independent store exhibiting specific major or minor defects. Stock was inspected every week during the observation period.

As shown in Figure 1 for **gold skinned, loose** sweetpotatoes, major defect levels were high at 30% compared to the 2% specification limit of the retailers.

Most marked issues were skin damage and skinning/ dehydration as well as bacterial rots. Other significant issues were related to splitting, chilling injury and fungal rots.

Minor defects generally have specification limits of 10% and were found at 16% on average. As Figure 2 shows, minor defects included light skinning (pre-cursor to more extensive dehydration), minor skin damage and superficial

insect damage and skin dryness.

Defect levels were consistently high throughout the year, even though bacterial rot issues were most pronounced after prolonged rain episodes starting last summer.

One driver for a high degree of skinning and skin damage on display in stores may be that customers select the better stock. However, that was not always the case as displays were often inspected after stock replenishment in the morning.

Bronzing was most pronounced in the months of September to January. While bronzing is thought to be associated with slow growth in the colder month (July to September), it appears that aged sweetpotatoes were harvested due to low market demand and oversupply.

Figure 1: Major Defects Identified at Store Level (Gold, Loose)

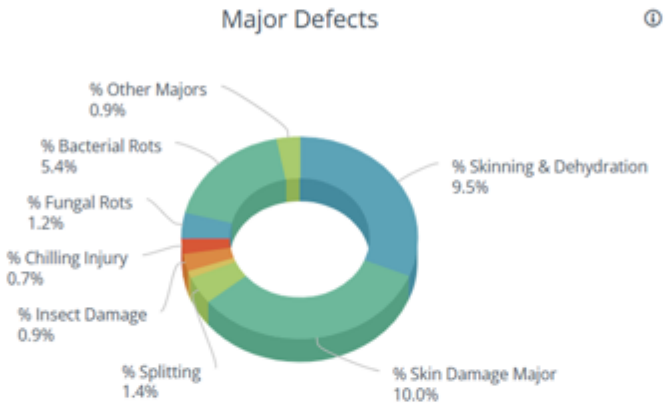
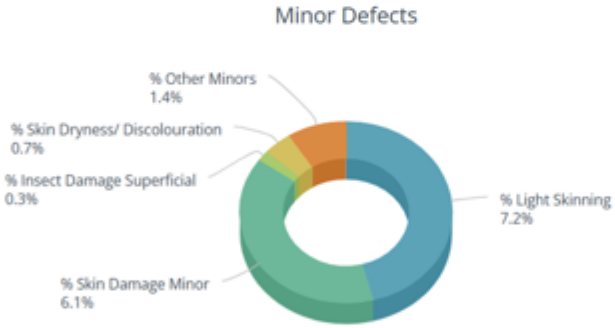


Figure 2: Minor Defects Identified at Store Level (Gold, Loose)



Pre-packed gold skinned sweetpotatoes generally had less severe skinning issues (2.5% on average), as the high humidity in pack stopped dehydration of these patches. However, condensation was an ongoing issue depending on pack format. This was made worse by temperature fluctuations. As a result, rots on cut ends were an occasional issue.

Overall, major defects affected 11% of the stock and minor defects affected 17% of the stock.

Figure 3: Major Defects Identified at Store Level (Gold, Prepacked)

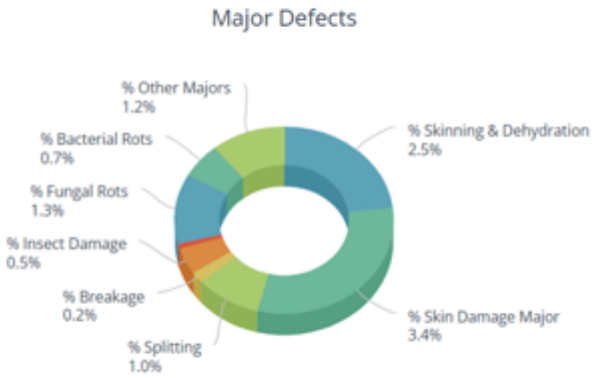
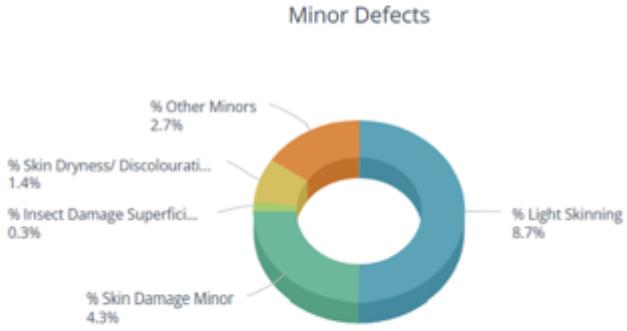


Figure 4: Minor Defects Identified at Store Level (Gold, Prepacked)



Organic, gold skinned sweetpotatoes were kept in refrigerated conditions at the start of the project. However, after communicating that this was causing chilling injury, the retailers moved them out of the refrigerated displays. Across the year, major defects were high at 39% and minor defects sat at 19%. Moving the tubers out of the fridge in stores by the retailers prevented further chilling injury. However, dehydration accelerated and resulted in more visible issues related to skinning. Fungal rots were also more pronounced. Dehydration was particularly a problem for loose and netted organic tubers, but cling film overwrap of carboard trays minimised that.

Figure 5: Major Defects Identified at Store Level (Gold, Organic)

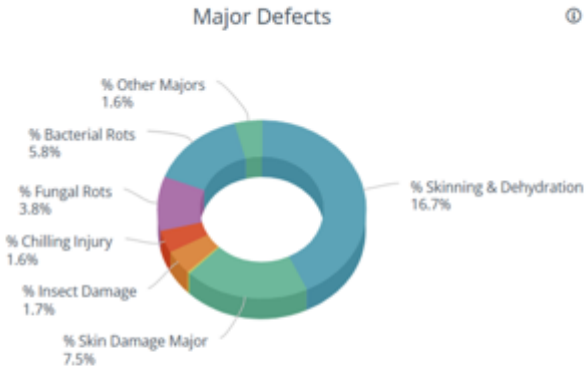
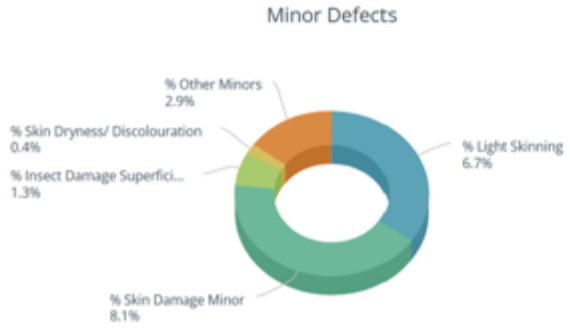


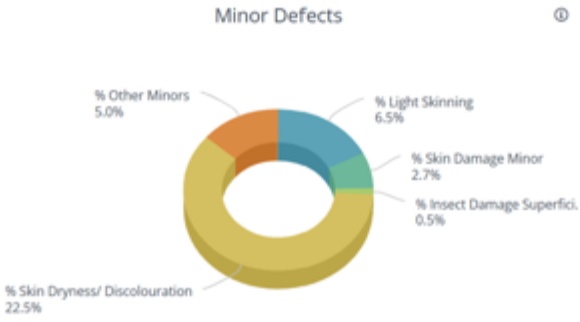
Figure 6: Minor Defects Identified at Store Level (Gold, Organic)



Purple, loose sweetpotatoes mainly had outer skinning damage (purple under-skin exposed) caused by rubbing and dehydration followed over time. The varieties on display appeared to be mainly Northern Star and Star that will experience skinning as a flaky look due to their double skin. Older tubers also showed a generalised dryness/ whitening of the outer skin. Fungal rots also caused significant issues. Major defects affected 33% of stock whereas minor defects were at 37%.

Figure 7: Major Defects Identified at Store Level (Purple, Loose)

Figure 8: Minor Defects Identified at Store Level (Purple, Loose)

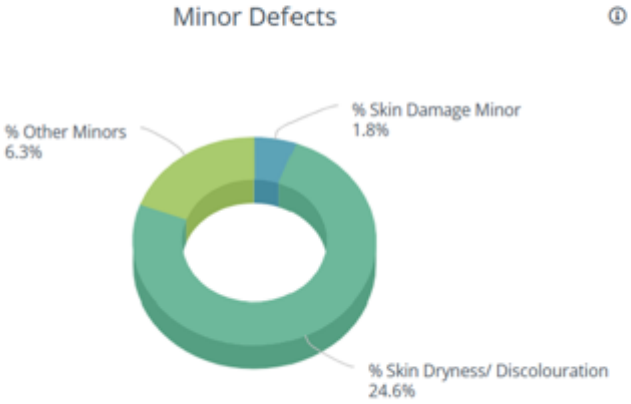


White skinned, loose sweetpotatoes 37% major and 33% minor defects. Many of the defects were linked to skin damage and fungal/ bacterial rots. Insect/ nematode damage was also more noticeable on the white skins.

A major contributor to poor quality perception was that a high amount of stock looked aged and yellowed on the shelf. Soil adhesion was also more noticeable compared to other types.

Figure 9: Major Defects Identified at Store Level (White, Loose)

Figure 10: Minor Defects Identified at Store Level (White, Loose)



2. Retailer Distribution Centre Data

Inspection data collected in the distribution Centres of the 3 major national retailers (ALDI, Coles and Woolworths) showed less focus on sweetpotatoes than on other produce categories unless there were very obvious issues. Data covers 530,489 cases in shipments that were inspected. The rejection rate for these was 3.3% with warnings for another 2.6%.

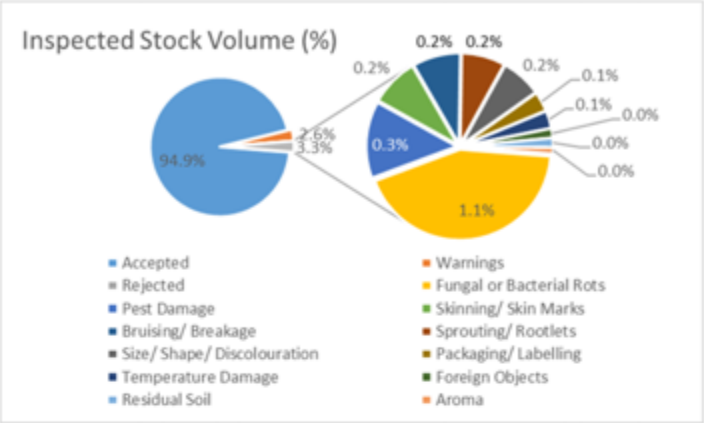
Rejections of stock primarily occurred for fungal rots (Figure 11). These were very obvious during inspections. Additionally, stock was rejected for pest damage, breakage and sprouting as well as other more sporadic issues.

Skin damage, skinning and bacterial lesions (in second half of the financial year), the main issues found in store, had few rejections as they were deemed to be less important in the inspections.

They were also generally progressive, meaning that the issues were relatively minor in the distribution centres and became worse in store and impacted significantly on the appearance of the stock.

Waste levels in store (markdown or disposal due to poor quality) were remarkably low at 0.18% over a 2-year period. When considering the degree of defects on shelf, it would be expected that more poor stock would be removed at store level.

Figure 11: DC Inspection Outcomes for Sweetpotatoes for January 2019 to April 2022

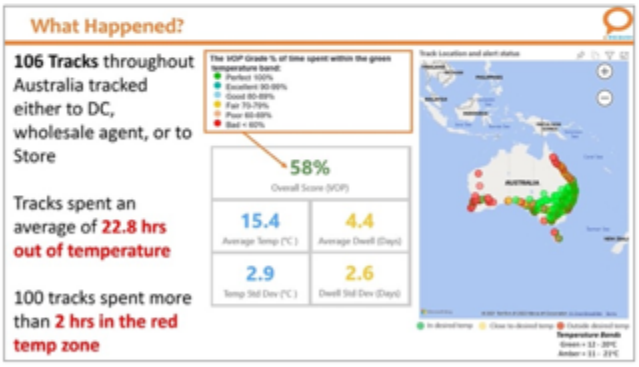


3. Escavox Datalogger Trial

An initial proof of concept trial with Escavox dataloggers was conducted. A total of 106 loggers were used with 2 growers (Sweet Potatoes Australia, Bundaberg, and Cudgen Farms, Tweed) in the period of October 2021 to January 2022. The key results were:

- 94% tracks did not meet temperature requirements
  - >2 hrs in the red temp zone
  - 30% of transit legs are too cold
- Potential for chilling injury and condensation as temperature fluctuates
  - 25% of transit legs are too hot
- Potential for bacterial lesions/ mould to accelerate, breakdown and of sprouting
- Average 'dwell time' of 4.4 days in transit plus the 2.6 days at DC
  - Sweetpotatoes are sitting idle for periods reducing shelf life and quality to customers

Figure 12 Escavox Data Trace Summary



After having completed the supply chain mapping with 4 key growers, it became apparent that quality issues were different at different times of the year and the data logging trial was extended for a continuous 12-month period until February 2023.

This will provide a comprehensive insight into the extent of potential temperature, humidity and delay issues within the supply chain across the country.

Business Case for Improving Sweetpotato Quality

As the 'Australian sweetpotato consumer insights research (PW18003)' project found, quality is a main driver for consumer purchase for 63% of respondents. Based on this research (see below) there is a significant opportunity to shift 'medium users' (45% of sample) of sweetpotatoes from doubling their consumption. This group is heavily impulse purchase driven and quality will significantly impact on their purchase behaviour. 'Light users' can also be influenced to increase purchase, but this is mainly by improved product knowledge. A small shift in consumer purchasing frequency in these two consumer segments can double consumption by these consumers.

Industry feedback suggests that marketing and promotional activities have not been working over the last 5 years or so. There seems to be a strong link between that and the fact that quality on shelf has been variable.

Over the last 10 years, the sales volume has grown 95%, but farm gate value only 60%. Farm gate value is currently around $83 million. Per capita consumption in Australia is 3.7kg (Sweetpotato Strategic Investment Plan 2022-2026, Hort Innovation).

This suggests that volume has grown to a level where price deflation has set in. To regain strong returns to growers, consumer demand needs to be increased. This is strongly linked to having a good quality product that consumers will choose in a competitive market with similar use products such as potatoes and pumpkins.

Recent industry insights indicate that crop production is about to decrease by 10-15% with several growers exiting the industry. That may have an effect of increasing farm gate pricing and ability to invest in quality improvements.

Roadmap Outlining the Key Solutions to the Issues Identified

The Distribution Centre data indicated that significant distribution issues such as fungal rots (associated with high and low temperature injury) occur at times.

Also, datalogger traces by Escavox indicated that significant exposure to high and low temperatures occurred in the supply chain. This supports the findings in the distribution centres of temperature related issues.

The store level data showed mainly issues related to skin damage/ skinning as well as rain related bacterial lesions. Issues with skinning and bacterial lesions were progressive issues in store and became a major determinant of poor quality being identified in store. Fungal rots were not as significant as in the DCs, presumably by being removed from the supply chain when severe.

The data set will be further extended through the extended Escavox data logging trial and the Hort Innovation project on managing skinning and skin damage at farm level (Causes and management strategies for skin loss in sweetpotatoes (PW21002)). This will be an essential part of addressing elements of the road map.

The key elements to the Quality Improvement Plan for sweetpotatoes are shown in Table 1.

Table 1: Key Quality Defects and Improvement Pathways for Sweetpotatoes

Sweetpotato Type	Quality Defect	Improvement Pathway	Impact
Generic	1. Skin damage and skinning 2. Low Temperature Injury 3. High Temperature Injury 4. Shelf-life loss 5. Nematode and other defects, sizing and shape	1. Improve pre-harvest, harvest and handling techniques, mixed grades specification to not allow more skin defects 2. Identification & mitigation of key stages in supply chain for temperature abuse 3. Identification & mitigation of key stages in supply chain for temperature abuse 4. Identification of supply chain stages with delays, minimization of delays, less temperature fluctuations, increased stock turn in store 5. Specification compliance by growers and checks by retailers	1. High 2. High 3. High 4. High 5. High
Gold skinned, loose	6. Skinning and dehydration 7. Bacterial lesions 8. Bronzing	6. Increase stock turn, remove poor product from display, investigate water loss reduction strategies 7. Improved post-wash drying strategies, potential for short term wound healing 8. Varietal selections, managing growing period	6. High 7. Medium 8. High
Gold skinned, prepack	9. Condensation and rots	9. Packaging improvements and minimising temperature fluctuations	8. Medium
Gold skinned, organic	10. Skinning and dehydration	10. Increase stock turns or improve packaging to control weight loss; avoid storage in refrigerated conditions	9. Medium
Gold skinned, mini	11. Excessive dehydration	11. Change format for mini sweetpotatoes	10. Low
Purple skinned, loose	12. Skinning and dehydration issue	12. Identification of supply chain stages with delays, minimization of delays, increased stock turn in store; improvement of washing procedures to reduce flaking; rotation of varieties to take advantage of different varietal characteristics at different times of the year	11. Medium
White skinned, loose	13. Stock age 14. Nematode damage 15. Handling	13. Identification of supply chain stages with delays, minimization of delays, increased stock turn in store 14. Implement more rigorous nematode control as varieties are relatively, but not fully, resistant 15. Minimise damage from rough handling during harvest and washing	12. Medium 13. Medium 14. Medium

The following breaks down the supply chain stages at which quality improvements need to be driven.

A. Seed Stock

- Selection of gold skinned varieties less prone to skin damage, splitting and bronzing (Quality Factor 1 and 8). A gold variety suitable for planting from September to December is available for most areas; this has a firmer skin at harvest and presents with a smoother skin at retail – timeline of 12 months.

B. Production

- Minimisation of excessive in-ground holding of gold skinned varieties during winter (Quality Factor 8) – timeline of 12 months.
- Sufficient pre-harvest topping period to allow skin hardening (Quality Factor 1, 6, 10 and 12) – timeline of 12 months.
- Ground preparation and selection to minimise nematode pressure (Quality Factor 5 and 14) – timeline of 12 months.

C. Harvesting

- Equipment design and handling practices to minimise skin damage during harvest (Quality Factor 1, 6, 10 and 12) – timeline of 12 months.

D. Packing

- Wash process design to minimise skin damage (Quality Factor 1, 6, 10 and 12) – timeline of 12 months.
- Wash water sanitiser and post-wash drying to control bacterial and other pathogens (Quality Factor 7) – timeline of 12 months.
- Post-wash short-term holding prior to cooling to allow wound healing and/or application of edible coating to stop dehydration of skin (Quality Factor 6, 7, 10 and 10) – timeline of 12 months.
- Optimisation of packaging material for pre-packed sweetpotatoes, including of material, gauge and perforations, to minimise condensation and associated rots (Quality Factor 9) – timeline of 6 months.
- Packing according to specification in relation to size, shape and defects such as nematode damage (Quality Factor 5 and 14) – timeline of 12 months.

E. Road Transport

- Loading stock at correct temperature (Quality Factor 2 and 3) – timeline of 6 months.
- Pre-cooling trucks to suitable temperature (Quality Factor 2 and 3) – timeline of 6 months.
- Maintaining suitable airflows and consistently correct temperatures (Quality Factor 2, 3, 9) – timeline of 6 months.
- Secure stowage to reduce mechanical damage (Quality Factor 1) – timeline of 6 months.
- Transport with compatible co-loads (temperature, cross-contamination) (Quality Factor 2 and 3) – timeline of 6 months.

F. Cross-Docking and Wholesaling

- Maintaining appropriate temperatures throughout and eliminating temperature fluctuations (Quality Factor 2, 3 and 6) – timeline of 12 months.
- Elimination of delays and storage at excessively low temperatures (Quality Factor 4, 12 and 13) – timeline of 12 months.

G. Retailer Distribution Centres

- Consistent use and enforcement of specifications to prevent quality erosion and price collapse (Quality Factor 1, 5, 7, 12 and 15) – timeline of 12 months.
- Elimination of delays through minimising carry over stock (Quality Factor 4, 12 and 13) – timeline of 6 months.
- Maintaining appropriate temperatures throughout (e.g. receival area, banana room storage) and eliminating temperature fluctuations (Quality Factor 2, 3, 6 and 9) – timeline of 24 months.

H. Retail Stores

- Purchasing consistency for specific varieties to maximise uniform product appearance on shelf (Quality Factor 5) – timeline of 12 months.

- Increasing stock turns on shelf through minimal carry over from day to day, stock rotation and removing poor quality waste stock (Quality Factor 4, 6, 10, 11, 12 and 13) – timeline of 12 months.
- More consistent pricing strategy (i.e. avoiding high/ low pricing) to drive faster, more consistent throughput (Quality Factor 4, 6, 10, 11, 12 and 13) – timeline of 12 months.
- Review range for suitability, e.g. mini sweetpotatoes displayed loose (Quality Factor 9, 10 and 11) – timeline of 12 months.

The Quality Improvement Project, including the extended data logging work, is well suited to work with the *Causes and Management* strategies for skin loss in sweetpotatoes (PW21002) project. The skin loss project will be able to drive some of the improvements suggested in this project, while Quality Improvement Roadmap highlights the wider framework that the skin damage reduction needs to happen within.

Part of the aims of the Quality Improvement Roadmap may only be effectively addressed in collaboration with the retailers. Discussions with retailers will be about on-shelf quality issues and stock turnover velocity. The discussions will also include understanding of staff training, ordering and impacts on in-store waste.

Roadmap Timeline

The timelines for the quality improvement plan are shown in Figure 13.

Specific Industry Engagement Activities are:

- February 2023: Grower roadshow in Cudgen and Bundaberg (Milestone 105)
- February -March 2023: Engagement with retailers (buying and technical) (Milestone 105)
- February -March 2023: Aggregator engagement at central markets (VIC, NSW) (Milestone 105)
- February 2023: Develop two 1-page flyers for retailers and growers of what good looks like (Milestone 105)

After the engagement activities, quality of product will continue to be monitored. This is to monitor changes to quality that have been achieved due to implementation of the quality improvement plan.

These observation will be reviewed against the quality finding pre-improvement plan:

- October-November 2023: Interim reviews with growers, wholesalers and retailers. (Milestone 106)
- February-March 2024: Final reviews with growers, wholesalers and retailers. (Milestone 106)

On completion of the final review, the project reports will be finalised. (Milestone 190)

Figure 13: Quality Improvement Roadmap

Outcomes

The outcome of the Quality Improvement Roadmap will be a comprehensive plan for the sweetpotato industry to improve quality across the supply chain, including on-farm, distribution and in-store. Overall the Quality Improvement Plan will:

- Drive accountability across all key stakeholders (growers, wholesalers, major supermarkets) to focus upon on-shelf quality, resulting in greater consumer acceptability;
- Continue to drive best practice across the supply chain from growers to retail and drive a positive culture focused on high quality standards for Australian sweetpotatoes; and
- Build capacity and understanding for quality improvement across the supply chain, with regular feedback provided.

Appendix 3 – Grower Newsletters

AUSTRALIAN SWEETPOTATO GROWERS INC.

AUTUMN 2022
EDITION 1

THE VINE

PRESIDENTS WORD

Troy Prichard
ASPG PRESIDENT

Welcome to the first edition of a series of industry newsletters from the Australian Sweetpotato Growers Association (ASPG). The purpose of this newsletter is to keep you in touch with important news about research and development (R&D) occurring in your industry, past R&D results, upcoming events and other information necessary to help you run your sweetpotato business effectively.

I have now been in the president chair since the AGM in November 2021. After many years of significant effort and dedicated service Rodney Wolfenden stepped down as the Association's president. Rodney guided us through the establishment of the R&D and marketing levies as well as moving ASPG to an incorporated association. I would like to personally thank Rodney for the leadership he provided and acknowledge that such dedication often came at time away from his family and business.

2022 has started with more of the same challenges for growers: depressed farm gate prices, excessive rainfall and flooding events and the ongoing battle to attract and retain workers. On a positive note, the management committee, with the support of Peter Long, is working hard to improve relationships with Hort Innovation and ensure we gain the greatest value from your grower R&D and marketing levies. My door is always open if you would like to discuss an industry matter or have an issue the Association may be able to help with. Please give me a call.

Troy Prichard, President

FROM THE EXECUTIVE OFFICER

I have now been in the executive officer's position on a part time basis since May 2021. I would like to thank all growers I have met for your welcome, patience and understanding as I get to know you personally, better understand industry issues, production approaches, marketing challenges and where I need to best focus my efforts. I appreciate that your time is valuable, as you focus on growing and marketing quality sweetpotatoes.

Over the past three months ASPG has been successful in being awarded two Hort Innovation projects. The first one is a communication project which provides funding for this newsletter, to be delivered over the next three years. The project is funded using your research and development levies with matching funds from the Australian Government. The second project, to be led by ASPG, is a very exciting project where up to 15 emerging leaders from the sweetpotato industry will be supported in a three-year professional development journey. Year one involves a three-day study tour of Sydney with visits to the markets, processers, supermarkets, and a distribution centre. I would encourage all in the industry to nominate someone from their business, whether growers or key staff.

Peter Long, Executive Officer

Australian Sweetpotato Growers Association Management Committee

Troy Prichard (President)
Matthew Prichard (Vice-President)
Eric Coleman (Treasurer)
Peter Long (Executive Officer)
Damien Botha
Rodney Wolfenden
Simon Doyle
Russell Mortimer
Russell McCrystal

Hort Innovation | SWEETPOTATO FUND

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

Improving quality of sweetpotatoes

Project Objective

To improve the quality of sweet potatoes by engaging key stakeholders (growers and retailers) to increase the consumption and demand of Australian sweet potatoes.

Why?

To increase:

> Purchase frequency
> Average weight of purchase (AWOP)
> Returns/profitability
> Stock-turn frequency (reduced waste)

How?

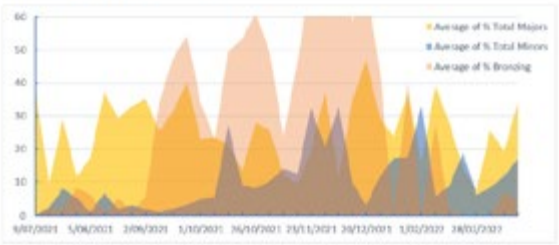
> Work collectively as a supply chain (growers, packers and retailers)
> Focus on ALDI, Coles and Woolworths
> Partner with key growers

Year 1: Build the data set to extract insights and inform decision-making

> Retailer engagement (ALDI, Coles, WW) and grower engagement via 6-monthly workshops
> Root-cause analysis of key quality issues (using historical data; retailer DC rejections and customer complaints)
> Monitoring of product quality (in stores and DCs)
> Propose and agree Minimum Quality Standards
> Annual Grower Roadshows with key grower groups (x3)
> Update articles via Australian Sweetpotato Growers.

Example of a Weekly Quality Update:
All retailers Vic 28/3/22

Major and Minor Defects



AUSTRALIAN SWEETPOTATO GROWERS INC.

The Quality Project team of Tristan Kitchener and Andreas Klieber presented two industry project updates in Cudgen and Bundaberg in May.

SWEETPOTATO QUALITY IMPROVEMENT ROADMAP PROJECT UPDATE

(HORT INNOVATION PROJECT PW20000)

PROVIDED BY TRISTAN KITCHENER (KITCHENER PARTNERS), ANDREAS KLIEBER (QUALITY ASSOCIATES)

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On 28 and 29 March 2023, the project team held discussions with growers in Cudgen and Bundaberg about the Quality Improvement Plan. It was stressed that all parts of the supply chain need to play their part in improving quality, and, ultimately, the consumer experience.

Project Leader, Tristan Kitchener from Kitchener Partners, provided a recap about the project aims and the current state of sweetpotato quality and its impact on industry success. He also presented the opportunities arising from improving the overall industry quality performance. This is summarised in Figure 1.

The roadmap for sweetpotatoes is detailed in Figure 2 below. Success for sweetpotato is to be positioned as an everyday staple that consumers see as a premium to standard potatoes; currently, in some retailers, sweetpotatoes are sold at a discount to standard potatoes. This will take a concerted effort by the whole sweetpotato industry, and most critically, a need to align interests and commit to working together to break the 'doom loop'.

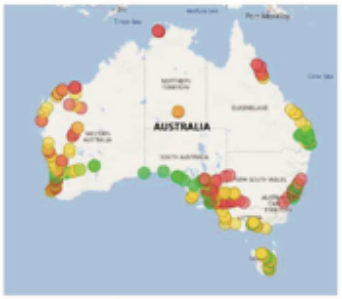
Cudgen workshop

Bundaberg workshop

Figure 1 From Doom Loop to Growth Loop

Figure 2 The Roadmap for the Sweetpotato Industry

Supplier legs



DC to Store legs

Figure 3 Comparison of Supplier and DC to Store temperature exposures (green = 12-20°C, red = chilling temperatures).

Given the current 25% reduction in plantings, there may be a flow on of better returns to the remaining growers. However, with old stock from exiting growers still filtering through the market, this has not consistently materialised as yet.

Andreas Klieber, Quality Associates, technical lead for the project, presented the summary quality data for the last two years of the project, as well as a summary of the Escavox data logging trial that measured temperature and relative humidity.

A key call out was that the quality of sweetpotatoes had not significantly improved over the last two challenging years. Some issues actually became worse, particularly bronzing that continued for several months longer in year two than in year one. This was likely linked to the harvesting of older crops.

From the quality data, specific issues were identified that are, in the majority, impacting on the on-shelf quality of sweetpotatoes and holding back sales. These were:

- *Skinning and skin damage leading to dehydration and poor appearance;*
- *Stock age at harvest;*
- *Slow stock turn and poor stock remaining on shelf; and*
- *Chilling exposure in parts of the supply chain.*

The Escavox data pointed to the main chilling events occurring in distant locations (NT, northern QLD and WA) as well as for specific distribution centres. This may be due to temperatures in the distribution centre or in the distribution vehicle to stores. On some occasions, sweetpotatoes also experienced chilling conditions at the back of the store before being placed on the retail shelf.

The next steps of the project are to agree on grower priorities to address these issues, followed by retailer discussions regarding the support they can provide the industry to address quality issues, particularly through the actions required by produce teams in-store.

The project will further monitor sweetpotato quality in-store to determine progress in light of the quality improvement roadmap.

For more information and a copy of the Quality Improvement Roadmap contact Peter Long via email aspg.sec@gmail.com.

Sweetpotato Quailty Improvement Roadmap Project Update

(Hort Innovation Project PW20000)

Tristan Kitchener (Kitchener Partners), Andreas Klieber (Quality Associates)

QAPartners Quality Safety Trust

Kitchener Partners

This project aims to improve the overall quality of sweet potatoes by fostering collaboration between stakeholders throughout the entire value chain. This network encompasses growers, wholesalers, processor, and retailers, all of whom play pivotal roles in ensuring high-quality sweetpotatoes reach consumers. Over the past two years, the project has monitored in-store quality and identified quality-related actions that have affected on-shelf quality.

Drawing upon the insights gathered during this project, key activities that can enhance the quality of sweetpotatoes have been compiled into a Quality Improvement Plan. This plan outlines the actionable changes that can be implemented across the broader supply chain. These changes aim to elevate quality standards, enhance consumer satisfaction, and, ultimately, drive an increase in the consumption and demand for sweetpotatoes.

Key recommendations from the Quality Improvement Plan are:

A. Production

- Minimisation of excessive in-ground holding of gold-skinned varieties during winter (due to bronzing).
- Sufficient pre-harvest topping period to allow skin hardening.
- Ground preparation and selection to minimise nematode pressure.
- Equipment design and handling practices to minimise skin damage during harvest.
- Wash process design to minimise skin damage.
- Wash-water sanitiser and post-wash drying to control bacteria and other pathogens.
- Packing according to specification in relation to size, shape and defects such as nematode damage.

B. Transport

- Loading stock at the correct temperature (13-20 degrees).
- Pre-cooling trucks to the correct temperature (13-20 degrees).
- Transport with compatible co-loads (temperature, cross-contamination).

C. Cross-docking and Wholesaling

- Maintaining appropriate temperatures throughout and eliminating temperature fluctuations.
- Elimination of delays and storage at excessively low temperatures (chilling injury).

D. Retailer Distribution Centres & Stores

- Consistently use and enforce the product specifications.
- Review delays through minimising carry-over stock and opportunities for holding temperature optimisation.
- Reviewing purchasing practices that impact stock-turn, suitable range and quality.

The roadmap has been shared with the industry and retailers in face-to-face meetings and has been widely accepted as presenting a real opportunity for improving on-shelf quality.

In response to the discussions, the project team is also developing retailer Quality Guides for stores and distribution centres, making recommendations regarding retailer specifications and a guide to the industry on tackling the most significant issues.

Whilst the project is still seeing quality issues in stores linked to a wide range of factors that were identified in the Quality Improvement Plan, by working as a collective supply chain, there is an opportunity to lift the bar for quality to improve consumer satisfaction.

The project will further monitor the sweetpotato quality of the product over the next 9 months in-store to determine progress considering the Quality Improvement Plan.

For more information and a copy of the Quality Improvement Roadmap contact Peter Long on M: 0490 324 671 or E: aspg.sec@gmail.com.

Appendix 4 – Retailer Quality Guides

Sweetpotato Quality Guide for DC Inspectors

Fun Facts about Sweetpotatoes

Sweetpotatoes come originally from tropical South and Central America.
They are **not** related to potatoes They have delicate skins and hate the cold.
Never put them in a cold room at less than 12°C.

Inspection and Quality Notes

Keep them cool, never cold

To maintain the best quality of your sweetpotatoes, keep them in the correct temperature zone. 12-20°C is the perfect temperature range for tasty sweetpotatoes. Minimise any time that they sit at any colder temperature, for example during receival inspections or despatch.
Keep at a constant temperature if possible as this extends shelf life and maintains a good appearance. Condensation will be even more of a problem for pre-packs.

Check for quality

★★★ Inspect sweetpotatoes against your specifications. Check the sizing and trim diameter and check that progressive and cosmetic defect levels are within specification. Keep in mind that some defects are not very obvious but contribute to a poor eating experience. This includes chilling injury and softness/ sponginess of the sweetpotatoes.

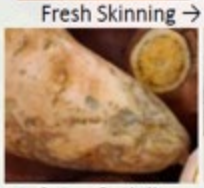
Progressive Defects

Watch out for skinning, skin damage, softness (especially of tips), dried-out appearance, chilling injury and pitting, and mould. Fresh skinning may become unsightly if left too long on the store shelf.


Fresh Skinning → Skinning and Dried Out

Major Skin Injury

Chilling Injury



Soft Rot & Chilling

Mould

Nematode Blisters

Cracking

Heat Collapse

Cosmetic Defects

Cosmetic defects do not generally progress and can be of a major or minor nature. This includes superficial insect and nematode damage, misshapen tubers, incorrect sizing, colour defects (e.g. greening), rootlets, and soil adhesion.

Seasonal Defects

Some defects occur more commonly in certain months, whereas others are dependent on practices during harvest and handling.
Skin damage is more pronounced during March to April; do not over-order and turn stock over quickly as quality may deteriorate quickly.

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
Skinning & Skin Damage												
Mould & Bacterial Lesions												
Bronzing												

Bronzing of sweetpotatoes is skin deep and develops with crop age in winter months. It does not affect eating quality.

Hort Innovation | SWEETPOTATO FUND

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Sweetpotato Quality for Retail Store Team Members

Fun Facts about Sweetpotatoes

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Merchandising Notes –Abundant Quality Displays = Sales

Keep them cool, never cold

To keep your sweetpotatoes nice and fresh, hold them in a dark and cool place until moving them to the shelf, never in a fridge.

12-20°C is the perfect temperature range for tasty sweetpotatoes. Keep at a constant temperature if possible as this extends shelf life and maintains a good appearance. Remove from mixed pallets that are moved into the cold room.

Handle with care

To avoid bruising and to keep your displays looking neat and tidy, do not empty trays of sweetpotatoes directly onto your display. Always unpack and arrange your sweetpotatoes carefully, laying each potato gently onto the display in a horizontal direction.

Perfect your presentation as for tomatoes and other vegetables

1. Within each type (gold, purple or white), arrange by freshness to ensure good stock rotation. Place new stock at the back of the display to encourage the purchase of existing sweetpotatoes first.
2. Arrange within these freshness groups according to colour and size. Group sweetpotatoes of similar colour together within each type and arrange larger sweetpotatoes on one side and smaller ones on the other. This will improve presentation and aid customer selection.

★★★ ***Check for quality***

Inspect your sweetpotatoes for skin damage, softness (especially of tips), dried-out appearance, pitting and mould on cut ends. Even minor defects can contribute to a poor eating experience, so take time to ensure your sweetpotatoes are in good condition.

The Bad and the Ugly – Ditch them, never leave these on show as they prevent sales!

If you wouldn't buy it, your customers won't either.

I am a bronzed sweetpotato. I may have darker patches on the surface, but I will eat just fine.

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