

Sustainable Farming Fund Project 405482 Effective Produce Traceability Systems

Milestone 4 – Traceability survey reporting, communication and promotion

12 June 2019

Executive Summary

Traceability and transparency are increasingly important in fresh produce value chains, both domestically and internationally. Traceability in the domestic fresh produce supply chain is currently not working to a common standard. Each value chain follows variations of its own to establish **internal** Traceability. **External** Traceability works better in some cases than others and not at all in extreme situations.

This project aims to understand the challenges and barriers that compromise effective Traceability in the domestic fresh produce industry.

The objective of this project is to assist growers, packers, marketers and retailers in the domestic fresh produce supply chain to understand how they can improve their internal Traceability systems while ensuring a more robust streamlined external Traceability framework at the same time.

Milestone 4 – Project communication and promotion

Project communication and promotion have been underway since the commencement of the project in July 2018. As we reach the end of year 1, we have reviewed the progress to date and determined the appropriate ways to effectively communicate to the wider industry our year 1 findings and our plans for years 2 and 3.

The project has selected one major conference to attend to provide background about the project, findings and updates, as well as goals and objectives. This conference will be the Horticulture New Zealand (HortNZ) conference in July 2019 in Mystery Creek, Hamilton. It will be an opportunity to gain industry feedback at an informal conversational level. We also intend to have digital and paper access to the milestone 2 grower survey to ensure participant numbers can increase to give a representative view of grower practices.

In addition to the major conference, the project has presented to the Strawberry Growers New Zealand sector group and will attend a HortNZ forum in October.

We have also worked with industry media such as the Grower and the Orchardist to promote the project, its objectives and results to date.

Planning for Milestone 5

Planning is underway to design an effective Milestone 5 – Loose supply chain Traceability study - Lettuce (loose and pre-packed). The study will occur in late June / early July 2019. This study will examine the "last 10 meters" of how product is moved and traced within a retail setting to understand what Traceability challenges are encountered and how to mitigate these challenges. In preparation for the milestone 5 study, we visited 3 lettuce growers in the Pukekohe region of Auckland. These growers were provided with information to be able to confirm what we are trying to achieve with the project and with milestone 5 in particular. These growers then provided insights and reasonings for their operations that have informed how we will conduct the study.

1. Introduction

This milestone report forms part of the milestones required for the Sustainable Farming Fund project 405482, Effective Produce Traceability Systems. This milestone report is entitled Traceability survey reporting, communication and promotion and covers the activities of milestone 4.

The key objectives of milestone 4 were to communicate and promote the project to the domestic fresh produce industry, by conveying the project's objectives, results to date and plans for the next 2 years and beyond.

The communication and promotion were undertaken in a variety of ways. This summary report is broken into 4 sections to cover our Communications Activities:

- Section 2: Conferences
 - Understanding what conferences the industry held and then identifying which conferences would best suit the information we were trying to communicate.
- Section 3: Industry forums
 - Attending and presenting at industry meetings.
- Section 4: Publications
 - Approaching industry media outlets to submit articles for publication.
- Section 5: Traceability paper presentation
 - Presenting to MPI in Wellington about the unique challenges of traceability in fresh produce industry and what learnings have been gained to date.

A full list of all Communication Activities can be found in Appendix 1.

2. HortNZ Conference

A calendar has been developed to identity the various industry events that occur over the year. Targeting the right conference, to ensure a fair representation of the whole industry, is critical at this stage of the project. Close communication between United Fresh, Horticulture NZ and the sector groups is enabling informative decisions on what level to pitch each presentation. As such we have selected to attend the Horticulture New Zealand Conference which will be held from 31st July - 2nd August in Mystery Creek, Hamilton. The HortNZ conference's theme for 2019 is 'Our Food Future'. United Fresh has provided support by being a conference sponsor.

We will have a booth on-site throughout the conference to promote the project. The intention is to distribute project material, discuss the topic of Traceability practices with conference attendees and encourage more participants to complete the milestone 2 Grower Survey.

In preparation for the HortNZ conference and future events, we have designed a pull-up banner to communicate the project's objectives.



3. Industry Meetings

The wider project team have taken every opportunity to present at various industry meetings. The audiences of these meetings have included participants from all links in the domestic fresh produce supply chain. Information presented and discussions evoked have been well received.

SGNZ Executive Meeting - February 2019

This meeting was a summary and conclusion of milestone 3's pre-packed supply chain study – strawberries. The attendees where interested in the grower survey results, supportive of the strawberry grower's involvement in the study and provided suggestions for consideration for the guidance document planned for release in milestone 10.

United Fresh Executive Committee Meeting – April 2019

The United Fresh Executive Committee meets bi-monthly and is comprised of representatives from grower level, packhouse level, wholesale level and retail level as well as from other industry points (<u>https://unitedfresh.co.nz/about-us/executive-committee</u>). At each Executive Meeting, updates on the project's progress are provided and discussion had to provide feedback to further the milestones undertaken.

United Fresh AGM – May 2019

United Fresh held their annual AGM in Auckland in May. The project's importance was highlighted by the chairman during the opening. In addition, the United Fresh Technical Advisory Groups (TAGs) presentation highlighted the progress of the project.

HortNZ Industry Forum - October 2019

This forum will be held in Tauranga and brings together the Chairs and Chief Executives from all horticultural product groups and a number of the district associations – in other words the industry leaders. This would also be an exclusive item and due to the number attending (around 60), would allow lively and informative discussion to be had. By this stage the major product studies will have been completed, and we will be seeking feedback and input from the industry on what form the final industry guidance document should take for milestone 10.

4. Publications

The project has responded to numerous requests for further information on our objectives, activities and learnings. The number of requests for information are increasing as more individuals are asking to be kept informed about the project. The larger publications include:

- The Orchardist Appendix 2
 - Experts, researchers and growers who all have in-depth technical knowledge of their industry write the content. It is seasonally appropriate and offers orchardists valuable advice across a broad range of growing topics.
- NZ Grower Appendix 3
 - NZGrower has been the voice of New Zealand's \$2.2 billion vegetable growing and berryfruit industries for more than six decades.
- The Otago Daily Times Appendix 4
- Radio NZ interview

5. Traceability Paper

Industry data made available to this project, was utilised to further understand current traceability and labelling practices. A copy of the Traceability paper can be found in Appendix 5. The conclusions drawn in the paper are:

"The knowledge brought together in this paper will be fed into the SFF project where applicable. What is already emerging, in the view of the authors, is the need to strengthen the fresh produce industry's ability to improve the traceback process in terms of timeliness and accuracy. This will very likely involve a rethink related to the use of barcode standards for outer packaging, pallet, and retail unit labels on fruit and vegetable shipments from producer to consumer."

To ensure not only the domestic produce industry understands the importance of traceability practices and how to ensure these are fit for purpose for the entire industry, it is important to share the learnings with the regulators of the industry. United Fresh have, therefore, organised for a wider Ministry for Primary Industries (MPI) presentation to occur in Wellington on Tuesday 18th July. This presentation is being coordinated by Natalie Collins, Manager Chemical and Microbiological Assurance.

It is our understanding that multiple divisions of MPI have been invited to attend the presentation which will highlight the nature of the fresh produce industry and the difficulties with traceability, current practices and areas for improvement in which this SFF project is focusing.

6. Conclusions

Research, activities and outputs that have been generated to date by this project have led to interesting and thought-provoking data and results. Industry comments, even from within the United Fresh Executive, have been of interest and led to individual organisations independently testing our findings within their own organisations. This is positive in that we are presenting the information in a way the industry understands and are able to see long-term that small system changes are needed now so that when legislation changes, they have momentum and systems that can handle the traceability requirements.

The first year of this project has investigated and established current practices to provide a base for meaningful industry conversation to develop a common standard to ensure robust and efficient traceability of all fresh produce.

	United Fresh - Sustainable Farming Fund Traceability Project 2018-2021 - Communications Record		
		As at 6 June 20	19
		Media Covera	ge
	Date	Article Description	Media Outlet
			Fruit Net
			Supermarket News
			sunlive.co.nz
			Food & Drink International
			Radio Sports, The Country
1	3/07/2018	Traceability Underway in N7	Scoop.co.nz
			NZ Farmers Weekly
			Southern Rural Life
			NZ Food Technology
			NZ Shipping Gazette
			FMCG Business
2	1/11/2018	United Fresh seeks Growers' help on Sustainable	Grower Magazine Insert
Z	1/11/2010	Farming Fund Traceability Project - Insert	Orchardist Magazine Insert
3	1/05/2019	Tracking Effective Traceability - Glenys Christian	Orchardist Magazine
5	1/03/2017		Grower Magazine
4	1/07/2019	LIE Traceability Project 2018 - 2021 Overview	MG Marketing's Supplyline
-	*Upcoming		July Edition
5	*Upcoming	UF Traceability Project 2018 - 2021 Overview	T&G Communications
6	*Upcoming	UF Traceability Project 2018 - 2021 Overview	Freshmax Communications

		E-newsletters	3
	Date	E-newsletter Details	Recipients
1	4/02/2019	SFF Traceability Survey with link to survey	467 Recipients 45.73%
2	29/10/2018	UF Seeks Growers' Help for Traceability Survey	Enews Group (462 people) 42.89% Opened
3	12/10/2018	New Traceability Publication Lit Review and Survey Available in Coming Months	Enews Group (466 people) 42.58% Opened
4	24/09/2018	Major Fresh Produce Traceability Project Underway in New Zealand - Strawberries	Enews Group (456 people) 46.09% Opened
5	3/07/2018	TAG Update - UF secures SFF for Traceability Project	Enews Group (456 people) 39.78% Opened

		Mail Outs	
	Date	E-newsletter Details	Recipients
1	9/07/2018	Letter with new Weights & Measures Guide and advising re UF securing SFF for a Traceability Project.	Main contacts plus key contacts 115 total
2	28/09/2019	Sustainable Farming Fund Project – Effective Fresh Produce Traceability Systems - Lit Review sent and advised survey upcoming.	37 Product Group Contacts
3	2/10/2019	Sustainable Farming Fund Project – Effective Fresh Produce Traceability Systems - Lit Review sent and advised survey upcoming.	91 Primary Contacts

		Conferences and We	orkshops
-	Date	Meeting/Workshop	Details
1	28/06/2018	2018 United Fresh AGM & Members Meeting	Jerry and Hans both spoke about the SFF project
2	23/07/2018	Hort NZ Conference	Jerry spoke about the SFF Project in his speech at the Welcome Reception
3	20/02/2019	Strawberry Growers NZ Executive Meeting	Mel presented overview of SFF to 10 Executive. Key feedback as to whether guide would be translated to other languages, i.e. Chinese.
4	23/05/2019	United Fresh AGM	Highlighted in Jerry's speech & Max's TAG report.

5	June & Ongoing	SFF Pop-Up Banner	Created to use at conferences and workshops, Hort NZ etc.
6	24/07/2019	Strawberry Growers NZ AGM	Estimated it will be about 80 attendees

		United Fresh Video with	SFF Segment
	Date	Meeting/Workshop	Attendees
1	Jun-18	2018 United Fresh AGM & Members Meeting	77 Members Attended
2	Jul-18	Hort NZ Conference	445 Conference Delegates
3	Aug-18	Balle Brothers	Presented to organisation
4	Oct-18	Potatoes NZ	Sent to organisation
5	Dec-18	United Fresh Website	Over 4000 users per annum
6	Apr-19	T&G Global	Presented to organisation
7	Aug-19	Hort NZ Conference	TBC conference delegates
8	Aug-19	Fresh Produce Safety Centre	TBC AMA presenting.

United Fresh LinkedIn		n	
	Date	Article	Impressions
1	9/07/2018	SFF Announcement	240 Impressions
2	8/08/2018	Hans Video	986 Impressions
3	7/10/2018	United Fresh Video including SFF	704 Impressions
4	11/10/2018	Work has begun on a three-year Sustainable Farming for Traceability Project - Lit Review.	188 Impressions
5	29/10/2018	Traceability survey - seeking Growers' help.	216 Impressions
6	12/11/2018	Strawberry case study	479 Impressions
7	21/11/2018	UF Website & Video	150 Impressions

		United Fresh Wel	osite
1	Adhoc	All articles, e-newsletters and information is shared on the United Fresh website: unitedfresh.co.nz	Over 5,000 visitors per year

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Tracking effective traceability

By Glenys Christian

Most growers believe traceability is important for supporting recalls, food safety, and stock management, with fewer than 40 percent feeling it's required for regulatory reasons.

An interim analysis of survey results shows the majority of respondents have recall procedures and the time and ease of conducting recalls is generally acceptable to growers. But they face challenges, including technology compatibility, record completeness, language barriers and time differences.

The survey is the first stage of a threeyear Ministry for Primary Industries (MPI) Sustainable Farming Fund (SFF) project running until 2021, looking at traceability in the domestic fresh produce industry, which is being led by United Fresh. The ultimate aim is to provide the industry with a guidance document that will inform and support supply chain participants in how they can achieve effective traceability.

Recent food safety issues are highlighting the need for fast, robust traceability back to source, it believes. Food-borne illness outbreaks, which cannot be traced back to a known starting point, create high cost industry-wide recalls and reduced consumer confidence.

The project aims to understand the challenges and barriers that compromise effective traceability. It's believed this will assist growers, packers and retailers to understand how they can improve their internal traceability, and as a result improve the standard of external traceability both domestically and internationally.

The project to date has included a literature review, an industry survey, wholesaler and grower traceability assessments, trials using barcode labels on pre-packed produce, and presentations to the horticulture sector. The literature review is available at the United Fresh website. www.unitedfresh.co.nz, click on Technical, then choose Sustainable Farming Fund.



Scanning crate labels at the distribution centre.

An online industry survey asking fresh produce growers to outline their current practices and understanding of traceability has been developed and will remain open until June or July this year. United Fresh is encouraging more growers and interested parties to undertake the survey which can be accessed via the weblink: https:// www.surveymonkey.com/r/R7G8B9H. Alternatively, it can be accessed through the United Fresh website.

A reverse traceback assessment was undertaken to provide an understanding of the traceability information available to consumers based solely on packaging and >>



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Barcodes on pre-packaged fresh produce can be scanned and traced through the supply chain.

labelling of the product and supermarket receipt, and also the ease of retrieving traceability data by both the retailer and grower. Traceback requests were sent to both the retailer and the grower, identified from the branding on the punnets. The grower in question was provided with photos of the punnets, including labelling and ink-jet printing. An example of a pallet label.

The growers involved found that the traceback was very quick at around five minutes and provided the project a photo of handwritten records and electronic files for the electronic records. The depth of data recorded and kept by the grower complies with the current requirements to provide one up/ one down traceability, and was sufficient for the grower to traceback the punnets to their respective packing lines. However, the system of record keeping is manual and not in a standard format that could be easily shared. In the potential scenario of a wider recall being required by MPI they would be requesting data from several sources, with it likely held in differing formats, both manual and electronic. And there would be inconsistencies in the type and depth of data across the supply chain.

The industry needs to explore standardising the type of data and format it is held in to enable fast and reliable sharing of data required in a recall. To support this goal, the use of scanning technology would aid the sharing of data created at the start of the process, guaranteeing that it was consistent across the whole of the supply chain.

The pre-packed supply chain traceability study's purpose was to gain an understanding of the supply chain, assessing ease of use of barcodes and scanning technology, and establishing realistic barcode scanning points for potential future commercial use. The study used strawberry punnets as being representative of all pre-packed products. It showed how barcode labels can be fixed to the product then scanned at pre-determined locations along the supply chain to trace the product from grower to consumer.

Labels were stuck to punnets, crates and pallets which comprised a GSI GlobalTrade Item Number (GTIN) code and a serial number. These were expressed as a barcode symbol with a number underneath. The barcodes were provided by GSI, the Californian designer and marketer of a wide range of high-performance memory products, and is the only globally recognised provider of GTINs and barcode symbols.

For this study, pallet labels as shown in Figure 4 were attached to partial and complete pallet loads, which is also a common practice for many transport companies moving product.

Small hand-held scanners were used to scan the barcodes.

The data in the scanners was then downloaded onto a laptop and analysed using monitoring software. The data showed the date, time and location of the punnets at each stage of the study, including the registration numbers of the trucks used to transport them. Large automated logistics warehouses already require the use of pallet barcodes for automatic scanning of product as it arrives and is moved into the warehouse storage racks.

This study showed that barcodes on pre-packaged fresh produce could be scanned and traced through the supply chain. Using the association of the various crate and pallet barcodes the punnets could be tracked along the entire supply

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The industry will benefit from having fast, accurate traceability.

chain, using scanning data recorded and stored in a single location, such as the monitoring software.

So, if the barcode on a punnet of strawberries bought by a consumer was then scanned the punnet could be traced immediately back to the packhouse and all scanning points in between.

Existing punnet, crate and pallet labels could be modified to include effective barcodes which includes important traceability data. These can be scanned, and the data recorded which would potentially save time and money. At least this does not add to the individual grower's or packer's time, resources and so costs.

Each scanning event stored other data as well as the barcode, such as date, time, location and vehicle registration. Additional data could also be included, such as grower, block details, the sprays and pesticides used, picker, packer, storeperson, and temperature of store or product at point of scan. Additional scanning events could be captured and scanned as well, such as movement through a metal detector. So in this way each punnet would be associated with a wealth of additional data that may be useful for food safety and recall purposes.

A key consideration is how the data is stored. A standard format allows the data to be shared with others and interpreted efficiently and quickly across the supply chain in the event of a recall situation or food safety issue occurring. Electronic solutions enable fast sharing of data, but using standardised formats enable the data to be accessed easily by multiple users, which is an important **60** The ORCHARDIST MAY 2019 aspect in the event of a recall or other food safety issue.

Individual organisations can store data on individual systems or databases in a standard format. In addition, major retailers both inside and outside of New Zealand are starting to mandate standardised GSI barcode use. This is why New Zealand producers and

exporters will have to, or have already, adopted GSI standards to carry on trading with their major export markets.

This study shows that barcode labelling of pre-packed product and the tracking of that product using scanning technology is possible. GSI is the only global standard provider operating in this space in New Zealand.

The question that arises for the domestic fresh produce industry is how it should engage with GSI to ensure that GSI-proposed industry solutions actually work for the industry. The approach taken by the International Federation for Produce Standards (IFPS), with regards to its relationship with GSI, could be used as a model.

Barcode design, application and scanning logistics, as well as data collection, storing and sharing, must be considered by the whole of supply chain so all needs are thought through. Using existing knowledge from GS1's international fresh produce standards will assist in any traceability design.

The industry will benefit enormously by having fast, accurate traceability in the event of a food safety incident, United Fresh believes.

"Too often, sections of the industry have suffered the effects of an industry-wide recall, where potentially contaminated produce is unable to be located with certainty."

In addition, extra costs such as relabelling along the supply chain do not add any value to effective traceability.

United Fresh acknowledges the support of the Sustainable Farming Fund, the AgriChain Centre, GSI and all participants in the survey and wider study.



Tracking effective traceability

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An interim analysis of survey results shows the majority of respondents have recall procedures and the time and ease of conducting recalls is generally acceptable to growers. But they face challenges, including technology compatibility, record completeness, language barriers and time differences.

The survey is the first stage of a threeyear Ministry for Primary Industries (MPI) Sustainable Farming Fund (SFF) project running until 2021, looking at traceability in the domestic fresh produce industry, which is being led by United Fresh. The ultimate aim is to provide the industry with a guidance document that will inform and support supply chain participants in how they can achieve effective traceability.

Recent food safety issues are highlighting the need for fast, robust traceability back to source, it believes. Food-borne illness outbreaks, which cannot be traced back to a known starting point, create high cost industry-wide recalls and reduced consumer confidence.

The project aims to understand the challenges and barriers that compromise effective traceability. It's believed this will assist growers, packers and retailers to understand how they can improve their internal traceability, and as a result improve the standard of external traceability both domestically and internationally.

The project to date has included a literature review, an industry survey, wholesaler and grower traceability



assessments, trials using barcode labels on pre-packed produce, and presentations to the horticulture sector. The literature review is available at the United Fresh website. www. unitedfresh.co.nz, click on Technical, then choose Sustainable Farming Fund. An online industry survey asking fresh produce growers to outline their current practices and understanding of traceability has been developed and will remain open until June or July this year. United Fresh is encouraging more growers and interested parties to undertake the survey which can be accessed via the weblink: https:// www.surveymonkey.com/r/R7G8B9H. Alternatively, it can be accessed through the United Fresh website.

A reverse traceback assessment was undertaken to provide an understanding of the traceability information available to consumers based solely on packaging and labelling of the product and supermarket receipt, and also the ease of retrieving traceability data by both the retailer and grower. Traceback requests were sent to both the retailer and the grower, identified from the branding on the punnets. The grower in question was provided with photos of the punnets, including labelling and ink-jet printing.

The growers involved found that the traceback was very quick at around five minutes and provided the project a photo of handwritten records and electronic files for the electronic records. The depth of data recorded and kept by the grower complies with

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the current requirements to provide one up/one down traceability, and was sufficient for the grower to traceback the punnets to their respective packing lines.

However, the system of record keeping is manual and not in a standard format that could be easily shared. In the potential scenario of a wider recall being required by MPI they would be requesting data from several sources, with it likely held in differing formats, both manual and electronic. And there would be inconsistencies in the type and depth of data across the supply chain.

The industry needs to explore standardising the type of data and

Scanning crate labels at the distribution centre.

▲ Barcodes on pre-packaged fresh produce can be scanned and traced through the supply chain.

format it is held in to enable fast and reliable sharing of data required in a recall. To support this goal, the use

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- An example of a pallet label.
- ▼ The industry will benefit from having fast, accurate traceability.

of scanning technology would aid the sharing of data created at the start of the process, guaranteeing that it was consistent across the whole of the supply chain.

The pre-packed supply chain traceability study's purpose was to gain an understanding of the supply chain, assessing ease of use of barcodes and scanning technology, and establishing realistic barcode scanning points for potential future commercial use. The study used strawberry punnets as being representative of all pre-packed products. It showed how barcode labels can be fixed to the product then scanned at pre-determined locations along the supply chain to trace the product from grower to consumer.

Labels were stuck to punnets, crates and pallets which comprised a GS1 Global Trade Item Number (GTIN) code and a serial number. These were expressed as a barcode symbol with a number underneath. The barcodes were provided by GS1, the Californian designer and marketer of a wide range of high-performance memory products, and is the only globally recognised provider of GTINs and barcode symbols.

For this study, pallet labels were attached to partial and complete pallet loads, which is also a common practice for many transport companies moving product.

Small hand-held scanners were used to scan the barcodes.

The data in the scanners was then downloaded onto a laptop and analysed using monitoring software. The data showed the date, time and location of the punnets at each stage of the study, including the registration numbers of the trucks used to transport them. Large automated logistics warehouses already require the use of pallet barcodes for automatic

scanning of product as it arrives and is moved into the warehouse storage racks.

This study showed that barcodes on pre-packaged fresh produce could be scanned and traced through the supply chain. Using the association of the various crate and pallet barcodes the punnets could be tracked along the entire supply chain, using scanning data recorded and stored in a single location, such as the monitoring software.

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So, if the barcode on a punnet of strawberries bought by a consumer was then scanned the punnet could be traced immediately back to the packhouse and all scanning points in between.

Existing punnet, crate and pallet labels could be modified to include effective barcodes which includes important traceability data. These can be scanned, and the data recorded which would potentially save time and money. At least this does not add to the individual grower's or packer's time, resources and so costs.

Each scanning event stored other data as well as the barcode, such as date, time, location and vehicle registration. Additional data could also be included, such as grower, block details, such as the sprays and pesticides used, picker, packer, storeperson, and temperature of store or product at point of scan. Additional scanning events could be captured and scanned as well, such as movement through a metal detector. So in this way each punnet would be associated with a wealth of additional data that may be useful for food safety and recall purposes.

A key consideration is how the data is stored. A standard format allows the data to be shared with others and interpreted efficiently and quickly across the supply chain in the event of a recall situation or food safety issue occurring. Electronic solutions enable fast sharing of data, but using standardised formats enable the data to be accessed easily by multiple users, which is an important aspect in the event of a recall or other food safety issue.

Individual organisations can store data on individual systems or databases in a standard format. In addition, major retailers both inside and outside of New Zealand are starting to mandate standardised GS1 barcode use. This is why New Zealand producers and exporters will have to, or have already, adopted GS1 standards to carry on trading with their major export markets.

This study shows that barcode labelling of pre-packed product and the tracking of that product using scanning technology is possible. GS1 is the only global standard provider operating in this space in New Zealand.

The question that arises for the domestic fresh produce industry is how it should engage with GS1 to ensure that GS1-proposed industry solutions actually work for the industry. The approach taken by the International Federation for Produce Standards (IFPS), with regards to its relationship with GS1, could be used as a model.

Barcode design, application and scanning logistics, as well as data collection, storing and sharing, must be considered by the whole of supply chain so all needs are thought through. Using existing knowledge from GS1's international fresh produce standards will assist in any traceability design.

The industry will benefit enormously by having fast, accurate traceability in the event of a food safety incident, United Fresh believes.

"Too often, sections of the industry have suffered the effects of an industry-wide recall, where potentially contaminated produce is unable to be located with certainty."

In addition, extra costs such as relabelling along the supply chain do not add any value to effective traceability.

United Fresh acknowledges the support of the Sustainable Farming Fund, the AgriChain Centre, GSI and all participants in the survey and wider study.



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Appendix 4

Wednesday, 17 April 2019 Journey from grower to consumer traced

By Yvonne O'Hara (/author/yvonne.ohara%40alliedpress.co.nz)



Rural life (/rural-life) > Horticulture (/rural-life/horticulture)



Researchers have been following strawberries from grower to retailer to find out how traceable produce is, in case of a recall. Photo: Wikimedia Commons

United Fresh researchers followed a punnet of strawberries from grower to retailer and now they intend to do the same for lettuce.

The domestic fresh produce industry body asked the AgriChain Centre to carry out a survey looking at the traceability of fresh produce from growers through to consumers, as part of a Sustainable Farming Fund study, late last year.

They wanted to find out how traceable produce was if there was an urgent product recall.

The study included smaller projects tracing strawberries, analysing labels and looking at technology.

Centre managing director Anne-Marie Arts said they sampled and traced hundreds of products across the supply chain using the many different labelling systems in place.

"That very clearly identified there are problems [with traceability]," she said.

"It confirmed the scale of the challenges from the industry's view point."

She said they identified several produce traceability issues, which they intended to address.

"We followed the strawberries from 'go to whoa', from being put into the punnet, then to the crate, the pallet, the truck, the distributor, the supermarket distribution centre, to the supermarket and to the customers."

Ms Arts said many businesses had a "one up, one down" system, as they knew who they bought the produce from and who they sold it to.

Problems occurred when new labels from the next players in the chain covered up information on previously placed labels.

She said by the time the produce had reached retailers, the products could have been labelled several times, which resulted in confusion or lost information.

"Less than 40% of those surveyed understood the requirements for regulatory reasons.

"There was also confusion from some growers about what a barcode does."

While most growers did have recall procedures to varying degrees, there were issues with technology compatibility, language barriers, and time challenges if there was an urgent recall of exported products.

Ms Arts said they found many barcodes in use had only basic or limited information and were largely preprinted, while other systems in use could not "talk" to each other.

"It will tell us this is a strawberry punnet but it doesn't say where it was packed, or details about its transfer through the system.

"Ideally we should be able to scan from the punnet to the plate but we currently can't do that in most instances."

She felt many of the current systems were inefficient and not robust enough should there be an urgent product recall, and the issues needed to be addressed.

"The next plan is to start a trial of loose-packed lettuce, using the lettuce as a proxy for a 'unpacked' or 'naked' crop."

Ms Arts said once the study was completed, they intended to produce guidelines for growers to address the issues and "ramp up the communications".

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Understanding Traceability Information in the Domestic Fresh Produce Supply Chain: A Snapshot Observation of Current Practices

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Introduction

Fresh produce presents a food safety risk to consumers², as many products are eaten raw, and thus do not undergo a kill-step (such as cooking) to kill harmful pathogens. Traceability, the ability to track a product through a supply chain to the product's source, is important within fresh produce supply chains to facilitate product recalls. The source of the Romaine lettuce *E. coli 157* outbreak in the US recently (2018), could not be effectively traced, resulting in the outbreak being attributed to the entire lettuce growing region of Yuma, Arizona³. One instance of a poor Traceability process had economic implications for the entire region.

Effective and accessible Traceability can be used to minimise the impact of food safety incidents in New Zealand's fresh produce. This paper discusses the observations gathered from examining the Traceability labelling on a quantity of domestically available fresh produce samples, collected at various supply chain points from around New Zealand.

The purpose of this paper is to report on the current baseline of 'end-to-end' Traceability within the New Zealand Fresh Produce industry. The information contained in this paper is operational in nature and based on The AgriChain Centre's practical experiences and learnings in sampling several hundred fresh fruit and vegetable products for a regulator initiated residue monitoring project.

Labels relatable to the sampled produce were studied to analyse the Traceability information provided. The scope of the survey only included fresh produce that was traceable to the Grower. Less formal segments of the Domestic Supply Chain (for example, road-side stalls) do not always have product that is traceable in any way, thereby creating a break in the end-to-end Traceability. By not including untraceable product in the survey, the full range of fresh produce was not included in the survey. However, the lack of a label made any attempt at Traceability analysis unjustifiable.

The survey provides a snapshot of the current Traceability data created, managed and held by different parts of the fresh produce supply chain. The study showed that, whilst basic compliance with current regulations is, in the main, being adhered to; i.e., one up, one down, other related challenges and pitfalls exist.

¹All with The AgriChain Centre Ltd (<u>http://www.agrichain-centre.com/about-us/the-team/</u>).

² <u>https://www.who.int/news-room/fact-sheets/detail/food-safety</u>

³ <u>https://www.fda.gov/news-events/press-announcements/statement-fda-commissioner-scott-gottlieb-md-current-romaine-lettuce-e-coli-o157h7-outbreak</u>

Methodology

Fresh produce samples were collected in the New Zealand market, from July 2017 to June 2018 and photographed to examine the level of Traceability present on the packaging as part of the wider regulator initiated monitoring project. Traceability information was available from three potential sources – grower/packer outer packaging, wholesaler packaging and retail packaging. Products that lacked any Traceability information were omitted from the sampling project.

The sample collection process worked as follows:

- 1. Purchase a sample of produce from a selected point in the supply chain.
- 2. Take photographs of the packaging and all Traceability information present on the packaging.
- 3. Examine the labels to determine the usability of any Traceability information present.
- 4. Record all available Traceability data.
- 5. Perform a series of statistical analyses.

In total, 327 fresh produce products were photographed at various stages of the supply chain.

The labels available from the total collection of products, were divided into three categories. A total of 193 outer packaging labels were identified, as well as 134 wholesaler packaging labels and 134 retail packaging labels. This produced a total data set of 461 packaging labels examined for Traceability information.

Label Categories Examples

Grower or Packhouse Labels



AFFLE	1842MC1AB
Variety: MAHANA RED	Grade NO1
N7.0	Size
NZ Gap: 355	90
Grower: MCHOPE	Weight
and the property of the	18 KG
MB & CL HO	PE

These labels are generated in the farm office or in the packhouse. Some grower/packers determine their own label design, many of them take guidance from wholesalers or retailers on the type of label that needs to be attached, dependent upon the channel the produce is travelling through to reach the consumer.

Wholesaler Labels



These labels are generated by wholesalers and attached to cartons and crates as the produce is received at the wholesaler premises and taken into stock. The practice of overlabelling grower labels is common.

Retail Labels



Retail labels are added to packaged produce either at grower/packer level or by a repacker, who works either in cooperation with a wholesaler or a retailer or independently.

Retail packaging includes any packaging material that is present on the retail shelf and contains the product a customer/consumer is buying. At the retail level, produce may be sold loose, sometimes directly from the grower/packhouse provided outer packaging.

Across the three packaging categories, several key Traceability data elements were identified:

- "Product ID" Product Identification.
- "Grower ID" Grower Identification.
- "Batch/Run/Lot" The identifying number of the shipment.
- "Serial" The identifying serial number of the outer packaging unit.
- "Pack Date" The date the product was packed.
- "Harvest Date" The date the product was harvested.
- "Product Sold Unwrapped" Produce was presented as loose units without any Traceability details present on the produce once it reached retail displays.

The Traceability information was generally presented in one of three formats - displayed as written in full (e.g. ABC Growers Ltd), a code recognised within a discrete section of the supply chain (e.g. ABCG), and/or barcode format, either internally generated or in a GS1 format.

Each Traceability data element was recorded as being in "Written" or "Barcode" format. Written Traceability data included any information that could be recognised and used by an individual without access to, or a working knowledge of, the internal tracking system of the grower, wholesaler, or retailer. This included data such as a grower's name and address.

GS1 DataBar labels were excluded from the "Product Sold Unwrapped" category, as GS1 DataBar labels are currently not consistently in use domestically.

To assist in understanding the results reported, it is helpful to include GS1 market penetration statements⁴ at this point. These are:

<u>At Retail Level</u>

"GS1 is the global retail barcode standard."

At Grower/Packer Level

"GS1 is typically used for the first level of outer packaging (cartons, trays, crates)."

<u>At Pallet Level</u>

"GS1 is widely but not universally used at the pallet level."

This will be further covered in the Discussion section.

⁴ Supplied Owen Dance, Manager, Quality Services, GS1 New Zealand, on 1st May 2019.

Results

Barcode and Traceability data was observed with moderate frequency on outer packaging (38.5%) originating from growers or packers, infrequently observed on wholesaler supplied packaging (18.5%) and most frequently observed on retail-ready packaged produce (71.4%), as shown in Figure 1.

Barcode Presence Observed

Bercentage (%) 0 10 20 30 40 20 00 00 00 Grower/Packer Wholesaler Retail

On packaging originating from grower/packers, written Traceability information was observed more often than Traceability data in barcode format for all data, except serial number (Figure 2). Serial number was more often expressed in barcode format (15.3%) than written format (10.2%). The product identification and grower details of the product were almost always expressed in written format (95.9% and 83.9% respectively).



Written vs Barcode Label Comparison – Grower/Packers

The GS1 data, where present, was most often found to be the Global Trade Item Number (GTIN). A GTIN number identifies the product it is attached to, e.g. wrapped lettuce. GS1 NZ expects the 'owner' of the GTIN to be the brand owner. The brand owner of the product

Figure 2

may not necessarily be the grower. By this we mean that a GTIN can be 'owned' by the grower/packer, the marketer, or the retailer, if the product is marketed under the retailer's own brand. This has implications in the event of a large product recall.

GTINs encoded in GS1 barcodes were present in 38.5% of observed labels (Figure 2). Variable data enabling particular batches of product to be identified were less prevalent, and when present were often expressed in GS1 format. Pack dates, when present, were in written format in 28.5% of instances, and in GS1 format in 1.1% of packages. Harvest dates were rarely observed but were found in written format in 1.8% of packaging and in GS1 format in 0.6% of packages.

Within the wholesaler environment, written Traceability information consistently identified the product (99.3%). However, it identified the grower at a lower frequency (57.1%) (Figure 3). Other written Traceability data was infrequent, specifically batch number (1.5%), Serial number (1.5%), pack date (3.7%) and harvest date (0.7%). GS1 formatted Traceability data was present at similar rates between product identification, grower identification, batch number and serial number (18.5%, 18.5%, 13.4% and 13.4% respectively). However, it is useful to note that only one major wholesaler used GS1 format Traceability data to identify outbound produce consistently.



Written vs Barcode Label Comparison – Wholesaler

Figure 3

Traceability information on retail packs was limited to product identification, grower identification and pack dates (Figure 4). Retail packaging had a high rate of observed product identification in both written (88.5%) and GS1 (67.2%) format. Similarly, grower identification prevalence was high within both written (63.5%) and GS1 (67.2%) format. Additionally, pack date was observed frequently in retail packed products in written format (33.9%), but never in GS1 format (Figure 4).



Written vs Barcode Retail Label Comparison - Retail Unit

Figure 4

Traceability data in GS1 format was displayed on most retail packed items but primarily consisted of the basic GTIN (Global Trade Item Number) data of the produce item and the "brand" owner identity, who may be either the grower, retailer or wholesaler. Growers made moderate use of GS1 identification, but once again limited themselves to largely GTIN data. Smaller numbers of wholesalers used non-retail barcodes generated on a bespoke basis (for example, pallet barcodes) to encode batch, serial, or date information.

Wholesaler labels contained GS1 barcodes less frequently than both grower and retailer labels.

Products and growers were identified most often in written data format on all levels of packaging, whereas specific information such as batch, serial number, or date was present at lower and highly variable rates in GS1 barcode format.

Additionally, pack dates were recorded moderately frequently, however almost never displayed in GS1 format.

Discussion

The high prevalence of GS1 barcodes on retail packed items is not surprising, as GS1 is the global retail barcode standard. Currently, however, retail barcodes only include the GTIN, and cannot carry supplementary data that would enable more granular Traceability in the form of attributes such as batch number, packed-on date, best-before date or country of origin. Therefore, barcode-based Traceability in the retail environment is currently not achievable, as opposed to in the logistics and distribution industries, where larger barcode labels can carry additional encoded data.

Traceability technologies and processes available today enable growers and exporters to demonstrate best practice in growing, harvesting, and processing. This, in turn, generates trust in the product.

Traceability also delivers additional benefits, such as:

- Assuring buyers of the source of the product (product provenance)
- Enabling effective recalls
- Reducing the risk of non-compliant produce entering the supply chain
- Supporting the automatic reconciliation of batches and volumes available
- Representing a potential method of stock control and monitoring
- Reducing the likelihood of recording errors

Barcodes have the potential to contain a large amount of Traceability information in a smaller surface area than conventional grower provided crate-cards. Furthermore, barcodes do not take up much space on one-way outer packaging, leaving more room for marketing messages.

Robust Traceability information is currently not carried along the supply chain, as Traceability data use decreases significantly on wholesaler provided packaging. While growers may have high levels of Traceability data on packaging, much of this information does not seem to survive travel to the retailer via the wholesaler, with the exception of textbased pack dates.

If Traceability data standards were more consistently and widely used across the supply chain, levels of Traceability would likely be much higher in the fresh produce industry.

Towards the end of the Methodology section, we included three GS1 market penetration statements. These deserve some further attention from a Traceability perspective.

Corporate retailers capable of operating scanning equipment operate on the basis of GS1 barcodes being the "barcode standard" their stores are able to recognise at the Point of Sale. The data captured through scanning is used for marketing purposes, for KPI measurement purposes, and for replenishment purposes. Corporate retailers support GS1's role as the standard setter at retail level.

Once barcode scanning became mobile, as a result of hand-held scanners becoming possible and affordable, barcode methodology for stock management and stock movement control rapidly spread along the supply chain. GS1's positions at the grower/packer level and at the logistics level are not as dominant as they are at the retail

level. That is substantiated by the use of the terms "typically" and "widely" in the other two market penetration statements shown in the methodology section.

This specific study on current Traceability practices did not concern itself with differentiating between GS1 barcode penetration and that of other systems. GS1's own statements, as well as our coincidental observations, confirm however that barcode structures other than the GS1 system exist. The produce industry is no exception, to the extent that some industry participants have designed their own barcodes, that follow GS1 principles, without these barcodes being generated by GS1, nor their owners having GS1 registration, and therefore not easily identifiable during potential recall situations.

The non-GS1 barcodes in use or the non-authorised GS1 barcodes that are also in use clearly fulfil a function successfully, in as much as they facilitate the movement of produce along the supply chain, otherwise they would not be used. With regulators and retailers wanting to expand the functionality of barcodes to include additional Traceability data that is currently not being included, barcodes that do not connect with ease up or down any supply chain are becoming a substantial challenge to individual businesses and industry at large.

Traceability information is present within New Zealand's domestic Fresh Produce industry but it is often fragmented and not carried throughout the entire supply chain. Produce which is re-labelled by wholesalers and distributors (often over-labelled across the packhouse identification labels), potentially loses valuable information and relies on the wholesaler to re-record (or duplicate) the data provided by the grower/packer. Removal or overlabelling of original packhouse labelling, introduces doubt about the identity of the original grower and/or supplier. It also adds significant costs in term of labels and resource.

The use of multiple formats for providing Traceability information on labels (written in full, written in code / barcode format) introduces discrepancies and potential errors in reading and interpreting the data provided. With multiple formats come multiple systems. This increases the time taken to transfer data from one system to another along the supply chain, and, more importantly, increases the likelihood of errors being introduced.

These breaks in the data integrity of the supply chain mean that traceback to the actual packhouse is often unable to be verified, and if it is successfully traced back, the time taken to do this means that an unacceptable amount of product will have entered the supply chain and reached additional consumers between an incident having occurred and the product source having been identified - thereby increasing the number of people potentially affected.

The New Zealand produce industry does not use a single system, format, or standard to hold and manage data from one end of the supply chain to the other. The introduction of a common standard that could support the transfer of data electronically, would increase the speed of recall in the event of a traceback being required.

The operational learnings from this monitoring project translate into confirmation that four fresh produce industry data-related supply chain scenarios exist in parallel within New Zealand.

<u>Scenario 1</u>

Grower/Packers provide little or insufficient supply chain data. This has wholesalers applying their own labels, allowing 'one-up, one-down' Traceability, but this is insufficient for food safety related traceback requirements. The re-labelling at wholesale appears to have its origin in internal administration requirements within wholesale companies.

<u>Scenario 2</u>

Grower/Packers provide sufficient supply chain data. When that data does not meet additional systems needs of a wholesale company, that company applies their own labels. This re-labelling also appears to be linked to wholesaler administrative requirements.

<u>Scenario 3</u>

A retailer company addresses its own needs to mitigate Traceability risk, and implements a bespoke system that assures the company of 'one-up, one-down' Traceability, regardless of whether they purchase product from a wholesaler or directly from a grower/packer.

<u>Scenario 4</u>

A wholesaler company is unable to, for whatever reason, fill a retailer's order via its usual supply sources. The company therefore obtains the product from another wholesaler – who typically runs a different, 'one-up, one-down' Traceability system.

Across all these scenarios, the following concerns arise:

- Product that leaves a grower/packer with insufficient or incomplete data cannot be traced, regardless of how well-developed upstream Traceability systems are.
- Different data standards along the supply chain have the potential to create uncertainty and confusion as the produce travels along the supply chain to the consumer.
- Label duplications at different steps in the supply chain represent a significant additional cost that is passed on, without generating any tangible benefits.

Unlike the shelf stable categories within the FMCG industry, the fresh produce category uses GS1 standards and systems inconsistently within its supply chains. The reasons for that difference in behaviour are related to the commodity status of many products within the fresh produce industry and the category's perishable nature which requires retail buyers to maintain degrees of flexibility to ensure their ability to offer consumers a full range of produce every day of the year. The accepted presence of competing wholesalers within the fresh produce supply chain system, and their understandable desire for differentiation from their competitors is also a contributing factor.

Nevertheless, modern data technology systems are increasingly capable of providing fresh produce specific solutions and these are being adopted in other parts of the world.

One such example is the GS1 DataBar. The DataBar (currently in use across Europe, North America and Asia, and being implemented in Australia's largest retailers Coles and Woolworths)⁵ has benefits for growers, wholesalers and retailers. The Traceability advantage is fast and accurate traceback of product to packhouse and/or grower. This means that issues can be contained as quickly as possible and non-implicated suppliers can continue business with minimal interruption.

Conclusion

The purpose of the regulator initiated Traceability monitoring project which supplied the source data for this paper was to contribute towards a baseline of knowledge about how safe the fresh fruits and vegetables for sale in New Zealand are. The Traceability requirements the regulator had for samples collected for this project meant that the produce sampled was selected from mainstream supply chain points, so that product track-back capability could be established, before the product was sent to the examining laboratory. This ruled out sampling any produce from those supply chain points where reliable Traceability information was not available.

This paper has reported and discussed the process involved in generating samples for inclusion in the regulator initiated monitoring project. This means that the scope of this paper was limited to reporting and discussing observations of current practices in those supply chains only that contributed produce for sampling.

United Fresh is currently implementing an MPI Sustainable Farming Fund (SFF) Traceability project entitled "Effective Fresh Produce Traceability Systems". The knowledge brought together in this paper will be fed into the SFF project where applicable. What is already emerging, in the view of the authors, is the need to strengthen the fresh produce industry's ability to improve the traceback process in terms of timeliness and accuracy. This will very likely involve a rethink related to the use of barcode standards for outer packaging, pallet, and retail unit labels on fruit and vegetable shipments from producer to consumer.

⁵ <u>https://www.gs1nz.org/about-us/news/gs1nz-news/gs1-databar-gains-traction/</u>