United Fresh
New Zealand Incorporated

Sustainable Farming Fund
Project 405482
Effective Produce Traceability Systems

Milestone 3 –
Pre-Packed Supply Chain Traceability Study – Strawberries

16 April 2019

Contents

Executive Summary

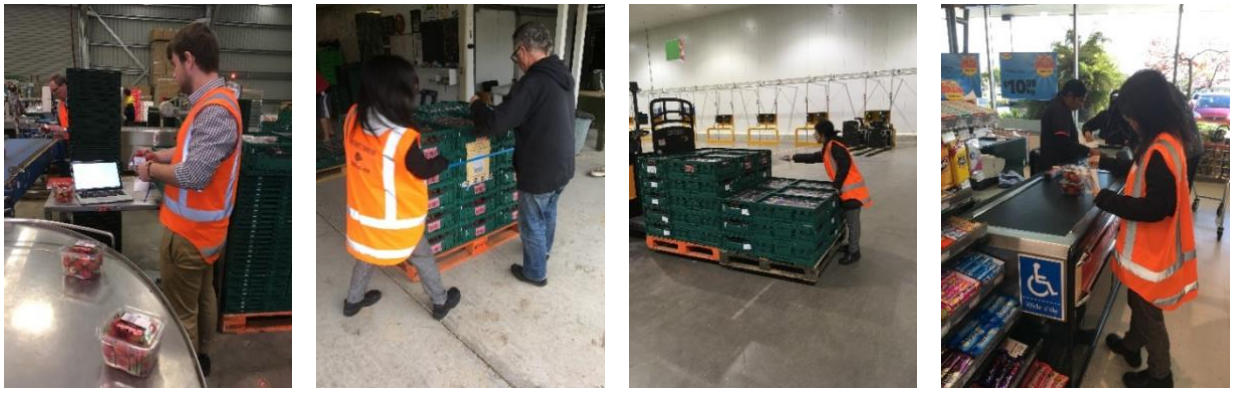
Traceability and transparency are increasingly important in fresh produce value chains, both domestically and internationally. Traceability in the domestic fresh produce supply chain is currently not working to a common standard. Each value chain follows variations of its own to establish **internal** 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 3 – Pre-Packed Supply Chain Study – Strawberries

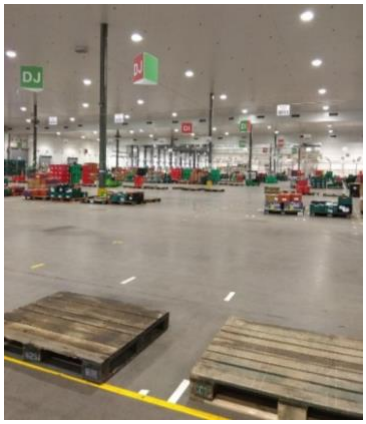
The strawberry study was representative of all pre-packed product and how barcodes could be affixed to the product then scanned at pre-determined locations along the supply chain to trace the product from grower to consumer. The study was a success with all followed pallets, crates and punnets scanned at up to 10 points along the supply chain.

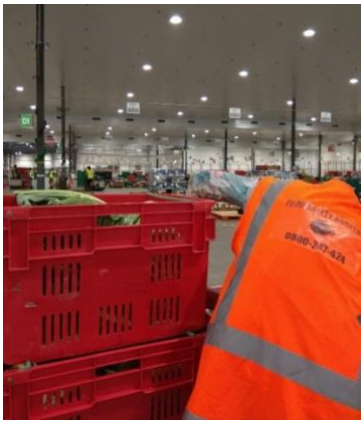


Photos from the Strawberry Study

It became apparent that some of our strawberry growers supplied their product via similar supply chains. To prevent the duplication, it was agreed that we would do a reverse traceback exercise with their product. Punnets of strawberries were purchased from a retailer and the grower and retailer were asked to provide the Traceability information they had.

To understand how retailers approach Traceability, it was decided that retailer Traceability assessments would also provide useful information to inform the project to give a whole of supply chain view. Traceability assessments were conducted with retail outlets from the two major grocery companies in New Zealand.





Photos from the Retailer Traceability Assessment

All components of Milestone 3 come together to highlight that the current Traceability labelling system can be improved to ensure complete and accurate records that can be easily shared between supply chain participants/regulators in the event of a recall or Food Safety incident. It has provided valuable information to inform the next milestones.

Milestone 2 – Interim Summary – Grower Survey

Grower survey results continue to trickle in, to date there have been 43 responses. This is a positive sign as we come out of what is the busy season for domestic growers. Therefore, we continue to promote the survey. In the meantime, we have compiled an interim report to show emerging trends to inform the project as we move forward.

Planning for Milestones 4 & 5

A calendar has been established to track the various industry events over the year. Formal planning has begun on Milestone 4 – Industry Engagement. Notwithstanding, we have already taken the opportunity to present to Tomatoes NZ and Strawberry Growers New Zealand (SGNZ) on project progress to date following their interest in the project's activity and active cooperation in the case of SGNZ. Close communication between United Fresh, Horticulture NZ and the sector groups is enabling informative decisions on what level to pitch each presentation.

Planning is also underway to design an effective Milestone 5 – Loose supply chain Traceability study - Lettuce (loose and pre-packed). This will include learnings from the strawberry study, changes in the industry and progression of relevant international knowledge.

Acknowledgements

Our thanks and gratitude for supporting the reverse traceback go to Gala Berry and Foodstuffs North Island.

Our thanks and gratitude for supporting the pre-packed strawberry study go to Sato Labels, Foodstuffs North Island, Zarberri, Danube Berries, MG Marketing, New World Mount Roskill, Pak'n Save Royal Oak, Vege Oasis, Panmure Fresh Supermarket, and Mount Roskill Fresh Supermarket.

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 Pre-packed Supply Chain Traceability Study – Strawberries and covers the activities of milestone 3.

The technical aspects of the strawberry supply study are reported in section 2 of this report. During the analysis phase of the pre-packed strawberry trial it was determined that the milestone report should be enhanced with some additional and supporting activities. The activity elements are:

- Reverse Traceback Activity (section 3).
- Interim Grower Survey Analysis (section 4).
- Retailer Traceability Assessment (section 5).

The reverse traceback activity is directly related to the strawberry supply chain study as the project team concluded that an attempt to trace delivered strawberries back to the grower from the retail store would assist in adding a degree of robustness to the study's initial observations.

The interim grower survey analysis reported in section 4 builds on the milestone 2 report submitted to MPI in November 2018. As a consequence of fewer growers than anticipated responding to the survey despite efforts to distribute the survey through avenues by which growers are reached, the project team has decided to manage the survey on a rolling basis, without prescribed or fixed deadlines. Section 4 therefore, reports on analysis of the first 40 responses.

The retailer Traceability assessment reported in section 5 is a concept that evolved as the project team reflected on its achievements in milestone 2 which had included a wholesaler Traceability assessment. The team concluded that it would be beneficial to also involve several retailers in the Traceability assessment process to ensure all opportunities and constraints along the supply chain are understood. The first assessment was conducted with Foodstuffs North Island Ltd and is discussed in section 5. The same assessment is planned to be conducted with Woolworths NZ Ltd and hopefully other retailers will agree to participate as well.

2. Pre-Packed Supply Chain Study – Strawberries

The strawberry study was devised to track berry punnets from grower to consumer using GS1 barcodes and scanning technology, with strawberries being used as a representative crop of packaged produce. The 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 took place over 3 days in October 2018. Labels, pre-printed with standard GS1 numbers and barcode symbols, were adhered to punnets, crates and pallets. Hand-held scanners were used to scan the barcodes at 10 scanning points along the supply chain, and monitoring software installed on a laptop recorded the data. Barcode labelled punnets were then purchased at 5 different retail stores. Each of those retail stores was the end point for one of the five separate strawberry supply chains that formed part of the study.

This study had multiple purposes to enable the project to learn and understand Traceability practices and potential. They included:

- Utilisation of pre-packed strawberry punnets as a proxy for all pre-packed product that is capable of having printed Traceability information applied.
- Gaining an understanding of the supply chain from grower to consumer and establish realistic barcode scanning points to enable tracking of the product.
- Trialling GS1 numbers and barcodes at the punnet, crate and pallet level.
- Understanding the challenges and opportunities for enhancing transparent Traceability to inform subsequent project milestones.
- Developing a process that captures data from the grower then carries that data through to the consumer, which can be reliably accessed and used in the event of a Food Safety incident.

Methodology

The study took place from 16th to 18th October 2018 and included two packhouses, one wholesaler, one Distribution Centre (DC) and five retail outlets.

Figure 1 shows the typical steps involved in moving strawberries from a grower's packhouse to a retail shelf.

Typical Steps in a Strawberry Supply Chain

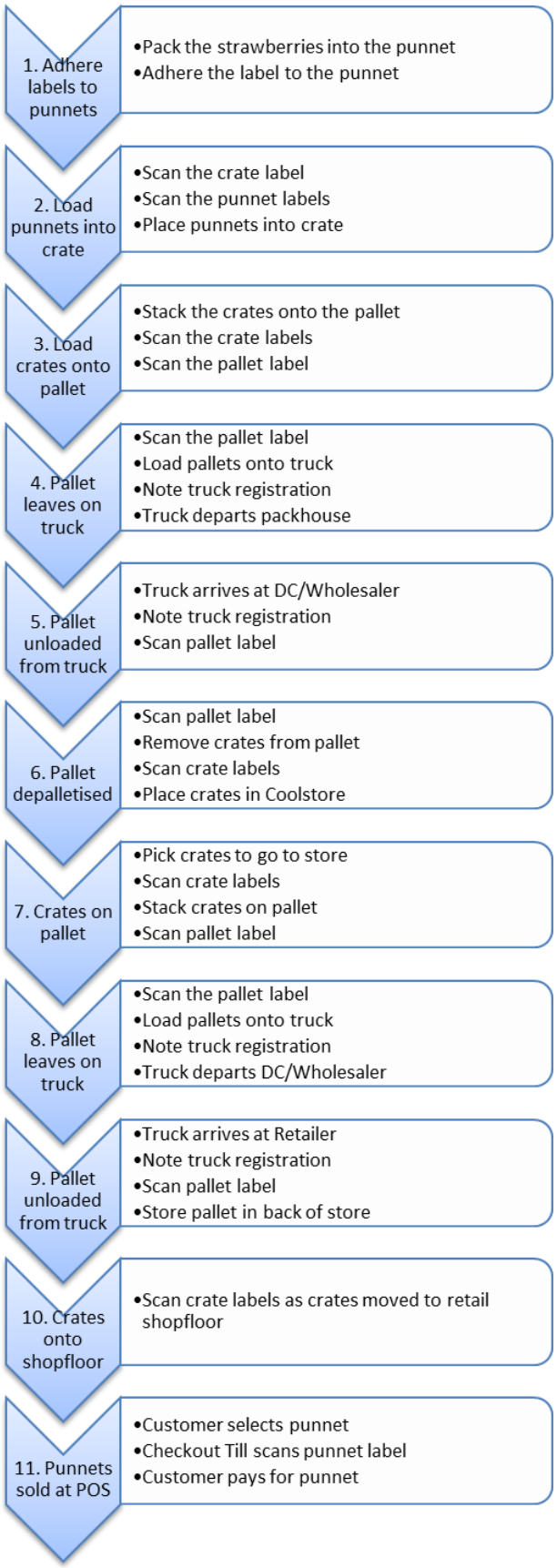


Figure 1

Process Flow

This section provides further detail related to the steps in Figure 1.

1. At the packhouses, the pre-printed labels were applied to the punnets and the crates at the packhouse.
2. As the punnets were loaded into each crate, the punnets and crate labels were scanned. The monitoring software associated the punnet barcodes with the crate barcode.
3. The crates were then packed onto a pallet, scanning the crate labels and the pallet label. Again, the monitoring software associated the crate barcodes with the pallet barcode.
4. As the pallet was loaded onto the truck, additional information was added to the monitoring software - time of loading and the vehicle registration of the truck.
5. At the two DC/wholesalers, the pallet barcodes were scanned, and the vehicle registration and time of arrival was added to the monitoring software.
6. As the crates were removed from the pallet, the crate barcodes were scanned – showing that the crates had arrived at the DC/wholesaler and placed into the coolstore.
7. Crates were picked, scanned and loaded onto mixed product pallets for retail orders. The monitoring software associated the crate barcodes with the new pallet barcode.
8. The pallet barcodes were then scanned as they were loaded onto the truck and the additional information added to the monitoring software.
9. On arrival at each retail outlet, each pallet barcode was scanned as the pallet was unloaded – showing each pallet (with their associated crates) had arrived at the retail outlet back of store.
10. The crates (with their associated punnets inside) were scanned as they moved from the back of store onto the shop floor sales space.
11. Two punnets of strawberries were purchased from each of the retail outlets, scanning the punnet barcodes at the POS (point of sale).

Two teams consisting of two people each followed the product from grower to retailer along the supply channels identified in Figure 1.

The two supply chains, starting respectively at grower A and B, were not identical although they both ultimately supplied three retail outlets each. Figure 2 shows these two supply chains alongside each other and highlights the generic differences and shows their fragmentation as the product nears the consumer shelf.

Strawberry Supply Chains Followed in this Study

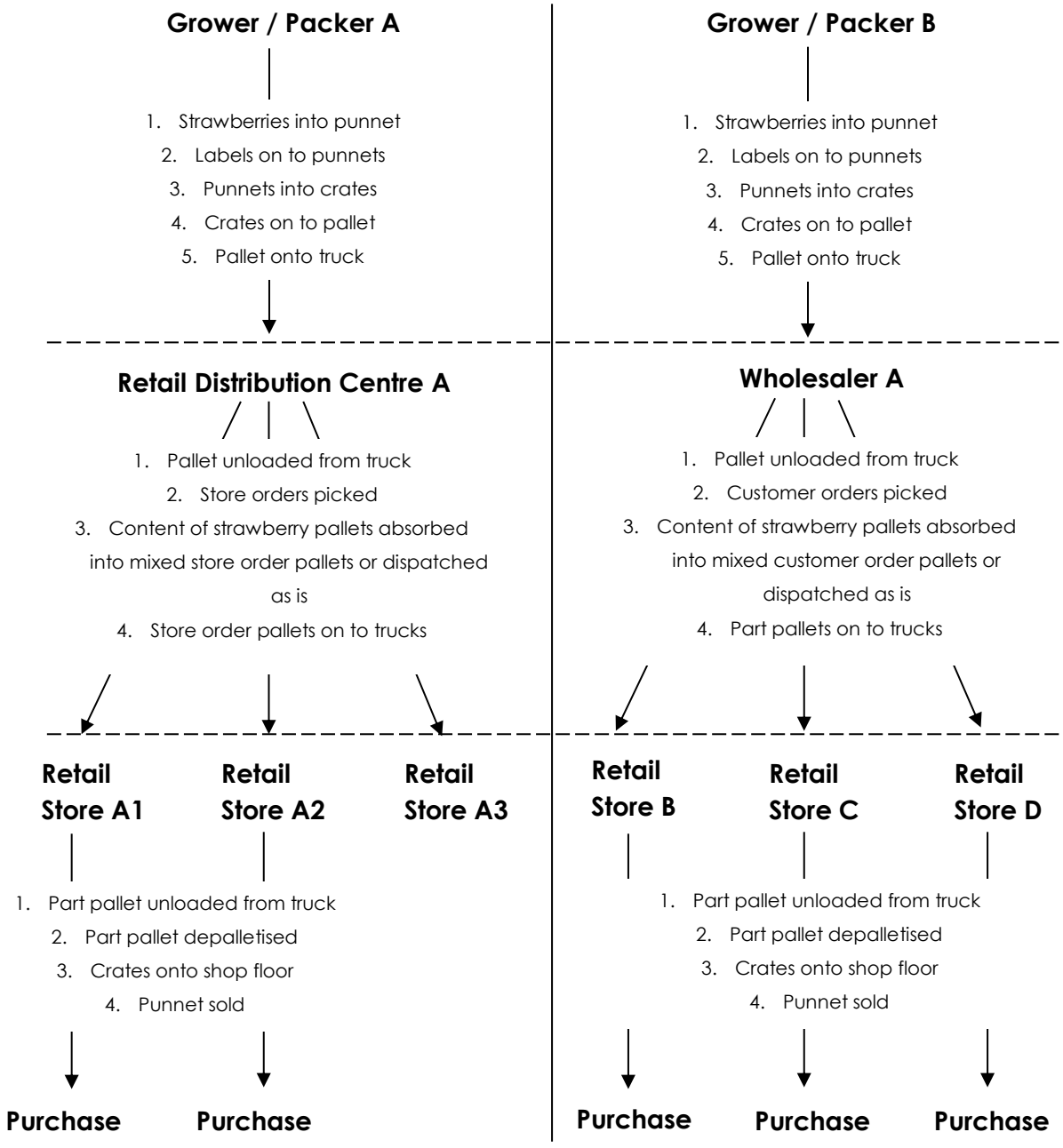


Figure 2

The barcodes on the labels were scanned at ten scanning points for five of the six supply chains (i.e. labelled punnets were purchased from five retailers at the respective ends of their supply channels). Scanning points are identified in Figure 3. Due to time constraints, one batch/lot of product was followed for only the first seven scanning points for the sixth supply chain.

Potential Scanning Points

Day 1		Day 2					Day 3		
Packhouse			Wholesaler				Retailer Back Store	Retailer shop floor	Point of Sale
Scan 1	Scan 2	Scan 3	Scan 4	Scan 5	Scan 6	Scan 7	Scan 8	Scan 9	Scan 10
Punnets into Crates	Crates onto Pallets	Pallets into Truck	Pallets from Truck	Crates from Pallets	Crates onto mixed Pallets	Pallets into Truck	Pallets from Truck	Crates onto shop floor	Punnets
Punnets and crates scanned	Crates and pallet scanned	Pallet scanned and truck ID noted	Pallet scanned and truck ID noted	Crates and pallet scanned	Crates and (new) pallet scanned	Pallet scanned and (new) truck ID noted	Pallet scanned and (new) truck ID noted	Crates scanned	Punnets scanned

Figure 3

Figures 4 – 6 are examples of the labels used for the study, indicating also where these labels were applied. The labels consisted of a barcode symbol, a GS1 number and a serial number. The GS1 number is called a Global Trade item Number (GTIN). The punnet and crate labels use a 14 digit number (known as a GTIN-14) and the crate label uses a 18 digit number (known as a Serial Shipping Container Code (SSCC)). The SSCC is the GS1 identification number for logistics units, i.e. pallets. The numbers and barcodes all comply with GS1 standards.

Example Punnet Label

Figure 4

Example Crate Label

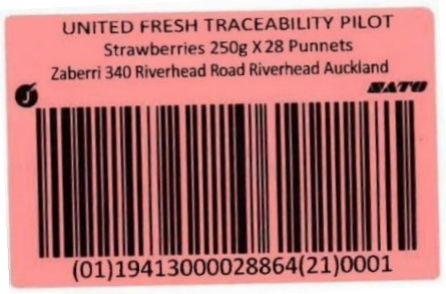


Figure 5

Example Pallet Label

Figure 6

For this study, pallet labels (Figure 6) were attached to partial and complete pallet loads, which is also a common practice for many transportation companies moving product[1].

Small hand-held scanners were purchased for the purpose of the study (Figures 7 and 8). Recording software was provided by GS1 NZ. The scanned data was recorded in the monitoring software on a laptop.

Scanning Punnet Labels at Packhouse

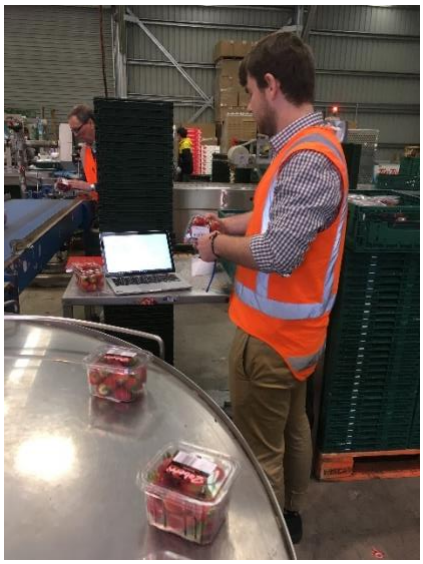


Figure 7

Scanning Crate Labels at DC

Figure 8

Outcome

The punnets were successfully tracked from packhouse to retailer using the scanners and monitoring software. Analysing the data stored in the software showed the date, time and location of the punnets at each stage of the study, including the registration numbers of the trucks that they were transported on.

Discussion

This study showed that barcodes affixed to pre-packaged fresh produce could be scanned and traced through the supply chain. For this study additional labels were applied to the punnet, crate and pallet. In the future, the costs could remain the same as more often than not punnet artwork and crate cards labels already include a barcode (Figures 9 and 10). These barcodes could be modified to contain important Traceability data, that could be scanned, and the data recorded. This potentially would save time and money, and at least does not add to the grower's or packer's time, resources and thus costs.

[1] 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.

The use of a single set of labels applied at, or near, the source and then used throughout the supply chain will inevitably reduce labelling costs downstream by removing the need for other parties in the supply chain to apply their own labels.

The use of the original labels by all parties downstream would eliminate the time taken to manage and apply separate labels at handover points such as grower to carrier to distributor to customer. The use of a standard identification number with associated data would reduce the potential for human error by linking the data between stages. Where electronic messaging is used to pass data about shipments between parties, at each stage the potential for human error could be completely eliminated.

Punnet Artwork with Barcode

Figure 9

Crate with Crate Card

Figure 10

A unique feature of both the punnet and crate labels was the addition of a serial number in the barcode, added to the end of the GTIN (Figure 11). This allows the tracking and identification of individual punnets/crates as they move along the supply chain. I.e. when selected crates are taken from a pallet for a shop order, you will have records of where the crates came from and which punnets are in the selected crates. Batch numbers could be used instead of serial numbers meaning that individual crates could not be tracked but all crates that contain punnets from a given batch would be identifiable.

Barcode Number Components

GTIN (Global Trade Item Number) Serial Number

Figure 11

The addition of a serial or batch/lot numbers to the label means that labels will need to be printed 'on-demand'. This may involve a small additional cost for the growers / packhouses. However, the wholesalers / DCs would no longer need to print new 'on-demand' labels.

An alternative is to continue 'on-demand' laser/ink jet printing batch information onto the punnets and manually entering this data into the monitoring software as the crates are packed. Tracking would then be done at batch level, rather than punnet level. It would be the responsibility of the packhouse to ensure the batch quantities were a suitable size. Packers would need to consider balancing the batch size and the frequency of changing the jet printer text/label maker when pre-printing product labels. This can be a challenge for Packers who may not receive orders before packing the produce.

Each scanning event stored other data as well as the barcode, such as date, time, location and vehicle registration. Additional data could be stored, such as grower, field (e.g. sprays/pesticides used), picker, packer, store person, and temperature of store or product at point of scan. Additional scanning events could also be captured and scanned, such as movement through a metal detector. Through these means each punnet can be linked with a wealth of additional data that may be useful for Food Safety and recall purposes.

Using the association of the punnet barcode with the crate barcode, and the crate barcode with pallet barcode, the punnets can be tracked along the entire supply chain, using scanning data recorded and stored in a single location, i.e. the monitoring software. Therefore, if the barcode on a punnet of strawberries purchased by a consumer was then scanned, the punnet can be traced immediately back to the packhouse and all scanning points in between.

The barcodes used in the study are a symbolic representation of the product data, enabling machine reading by scanners. The GS1 numbers and barcodes complied with the standards of GS1, the only globally recognised provider of number identification and barcode standards. Standardised numbering formats and barcodes enable accurate storage and easy sharing of standard data across systems along the supply chain. It is this easy sharing of data between organisations that supports fast and accurate recalls.

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 used easily by multiple users – 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 and may choose to allow one or more trading partner to access the data.

A more comprehensive solution is the use of an online data storage solution or database (such as the concept of blockchain). Organisations can feed their data into a globally available database. This would collect all the data across the supply chain in one central place. In the event of a nationwide or international recall, the data is available in one central place.

The GS1 standard is already the global retail standard and is required by virtually every retailer in the world. Consequently, New Zealand producers and exporters already use it on their retail items and typically on their cartons and pallets as well. The GS1 system is recognised by the European Union for satisfying the Traceability requirements of the EU food laws, the Chinese government for identifying cross-border shipments and World Customs Organisations for unique identification shipping.

For New Zealand producers, extending their use of GS1 standards to include Traceability data would be a relatively simple and inexpensive step compared with the adoption of a parallel or replacement system solely for the domestic market. As this study has shown, the use of alternative systems is currently problematic in the New Zealand fresh produce supply chain, requiring additional labelling, record keeping, and training as well as introducing scope for error in data transmission.

Internationally, the beginnings of a move by retailers towards the use of different GS1 barcodes on fresh produce is becoming evident. While some years are likely to pass before these different barcodes are in use here in New Zealand, the development is likely to occur within the operational lifetime of scanners purchased in the near future. Companies with an interest in fresh produce Traceability should be made aware of this and encouraged to consider buying scanners capable of scanning these different barcodes at their next equipment upgrade.

A decision on what technology is used is important due to the rapidly changing options. However, this needs to be balanced with the need for an underpinning standard.

Conclusions

This study shows that barcode labelling of pre-packed product and the tracking of that product using scanning technology is possible. Regulators in New Zealand may ultimately require an industry standard for the use of product and product movement related data generation and capture in order to improve Traceability capability along the fresh produce supply chain. GS1 is the only global standard provider operating in that space in New Zealand, let alone the domestic produce industry in New Zealand, does not have critical mass to decide to seek and develop an alternative. The question that arises therefore 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. GS1 is working with the International Federation for Produce Standards (IFPS) in this space to overcome the challenges and complexities that the fresh produce industry presents.

What will ultimately be required for the barcode design, application and scanning logistics as well as data collection, storing and sharing, needs to be considered by the

whole of supply chain. This could utilise the existing knowledge from GS1's international fresh produce standards. Thought will also need to be put into future-proofing the system as more regulatory and voluntary compliance requirements come into play.

The industry will benefit enormously by having fast accurate Traceability in the event of a Food Safety incident. 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.

Recommendations

- The industry adopts a common underpinning barcode standard i.e. GS1.
- Barcode potential to carry robust tracking data is fully utilised, i.e. barcodes do not just translate into 'strawberries'.
- Punnet and crate barcodes should be incorporated into existing punnet/crate labelling.
- Labels should be visible throughout the supply chain, i.e. crate labels facing outwards on the pallet to enable easy scanning.
- Robust labels are used that adhere to the punnet/crate/pallet as it moves along the supply chain.
- Consideration is given to scan produce more frequently as it travels along the supply chain in order to create more authenticated data points, as occurs in other countries. Scanners need to be sturdy, temperature resistant, affordable, easily available, and compatible with a range of software, with the capability to temporarily store data.
- Scanner purchasing decisions should include consideration about changes to technology.
- Ownership of data and commercial sensitivities need to be considered when sharing data confidentially during a Food Safety incident/recall.

3. Reverse Traceback Activity

Punnets of strawberries purchased from a supermarket were successfully traced back by the grower to the batch and field, albeit via a manual process. The retailer was able to use their electronic system to advise one up, one down Traceability information.

The traceback assessment was conducted to compliment the strawberry study. Two pre-packed punnets of strawberries were purchased from a supermarket. A traceback assessment was then undertaken to provide an understanding of the Traceability information available to consumers based solely on packaging and labelling of the product and supermarket receipt.

The purpose of the reverse traceback was two-fold:

- To provide an understanding of the Traceability information available from both the retailer and grower for a pre-packaged product such as punnets of strawberries.
- To understand the method and ease of retrieving Traceability data by both the retailer and grower.

Methodology

Two punnets of strawberries were purchased on 15th December 2018 from New World Howick, Auckland. A request for Traceability information along with photos of the punnet label and inkjet printed codes were sent to the grower. At the same time, a request for Traceability information along with a photo of the till receipt was sent to Foodstuffs North Island (owner of New World supermarkets).

The data received from the participants was then analysed to understand how the Traceability information was pulled together, what information was held and how this information could be used in the event of a Food Safety event or recall.

Outcome

Retail level

Two punnets were purchased from New World – Howick on 15/12/2018 at 10:00 am from self-serve check out Cashier 9, using the Point of Sale product description "Strawberries NZ PP 250g" (Figure 12). We noted that more than one brand of strawberries was available on the retail shelf.

Foodstuffs North Island participated in the traceback by providing information from their records based on the supermarket till receipt and advised that the punnets in question came from Freshmax. The response was provided quickly via email, although no supporting evidence was provided.

Supermarket Till Receipt

NEW WORLD

**** New World Howick ****
** Cnr Union Rd and Wellington St **
** Turas Limited **

Trading Hours Mon-Sun 7:00am to 10:00pm
*** Tel: 09 538-0012 ***
Online shopping is now available
Download the I shop New World app
Find out more at ishopnewworld.co.nz

B8 STRAWBERRIES HEAT SEAL NZ PP 250G	$1.99
STRAWBERRIES NZ PP 250G	
2 @ $1.99	$3.98
3 BALANCE DUE	$5.97
ROUNDING	$0.03
CASH	$20.00
SUB TOTAL	$5.19
TOTAL GST	$0.78
TOTAL	$5.97
CHANGE	$14.00

Fly Buys: 601435******9729

CASHIER NAME: SCO Cashier 9
15/12/2018 10:00:08 04052 009 0652 0099
********** TAX INVOICE **********
*** GST No. 91-439-662 ***
All items GST inclusive
unless otherwise specified by (*)
All promotions exclude Tobacco, Gift
Card, Christmas Card Purchases and
Payments on Account
THANK YOU FOR SHOPPING AT NEW WORLD

Figure 12[2]

Grower level

The grower was identified on the lid of the punnet. The bottom of the punnets had labels showing GTINs and barcodes. The labels also provided in text the producer and location information. Also included on the labels was a "KEEP CHILLED" instruction and the net weight (250g per punnet) (Figure 13).

The punnets also displayed inkjet codes (GB PACKED 3CAM 10 DEC 18 and GB PACKED ON 4CAM 101218)[3] (Figure 14). These codes include pack date and pack line information. The codes enabled the packhouse to refer to handwritten records.

[2] The strawberry punnets in this traceback exercise are indicated by the red box. It is noted that more than 1 strawberry sample was purchased on the day, as part of a different project. Foodstuffs North Island were able to provide wholesaler details for both items.

[3] Please note that the inkjet codes are reproduced here as they were printed on the punnets. This is further covered in the discussion section.

Traceability on Punnets

Figure 13

Comparing Inkjet Printing on Punnets

Figure 14

The handwritten records for picked fruit arriving at the packhouse detail the date, time, variety, chiller temperature range, the block the fruit was picked from, and number of crates picked. There is some duplication of data between the two manual records maintained by the grower.

The packing records are able to be matched to the handwritten despatch records for the packed fruit leaving the packhouse. These records for packed fruit leaving the packhouse detail the date, time range, chiller temperature range, packing line, client, pack size, quantities, and total number of cartons dispatched. Data left blank included the dispatch temperature and batch codes. Shipments against sales are kept in both a manual, handwritten format and repeated electronically in a summarised spreadsheet.

The grower advised that the traceback was very quick (approximately 5 minutes) and provided the project a photo of handwritten records and electronic files for the electronic records.

Discussion

Whilst the depth of data recorded and kept by the grower is comprehensive and was sufficient for the grower to traceback the punnets to their respective packing lines, the system of record keeping is manual and not in a standard format that could be easily shared. However, knowledge of the manual system resulted in a painless and quick 5-minute search of the records to provide the data requested. It is noted that the request related to only two punnets. To execute a more complex traceback across more punnets and more delivery dates would add to the time taken.

The inkjet system responsible for identifying the brand packed, the date the punnets were packed, and the line used is an area of concern, for the following reasons:

- The codes are different in font size
- The codes are not appearing at the same position on each punnet
- The codes appear to be entered manually at each pack line as the code relating to pack line 4 includes the word "on", unlike the punnet packed on pack line 3
- The nomenclature used to represent dates differs between pack lines. Pack line 4 uses "101218". Pack line 3 uses "10 DEC 18"

The chance of human error occurring, or confusion being created inadvertently by such an approach, must be considered as high.

Taking the potential scenario of a wider recall being required by MPI, they would be requesting data from several sources, with data likely held in differing formats, manual and electronic, and inconsistencies in the type and depth of data across the supply chain. The collation of the data provided, into one readable, consistent document, would therefore be extremely time consuming and open to additional human error. For example, if duplicate data is recorded then any discrepancies between those two data sets will introduce doubt as to which record is correct. In addition, handwritten records introduce legibility issues. These may make interpreting records difficult and time consuming thereby delaying any recall action.

Data typed into an electronic system, whilst subject to the potential issue of mis-typing, can be used in multiple documents. Reporting on the data becomes far simpler and less time consuming. Some electronic systems also support the use of scanning technology, reducing time and effort manually typing information into the system.

The supermarket receipt also highlights that a loyalty card was used as part of the purchase. This raises the question, whether the presence of this code and underpinning customer information would allow a retail outlet to inform the customer that their purchase has been linked to a Food Safety event?

The loyalty card used in this instance was a Fly Buys card. The customer data related to that card is believed to be held by the scheme owner, Loyalty New Zealand Limited. Foodstuffs New Zealand Limited, as opposed to Foodstuffs North Island Limited is only a 25% shareholder in that venture. Accessing the customer directly might therefore not be as simple as it sounds. On the other hand, Foodstuffs North

Island have recently introduced New World loyalty cards. Presumably the customer data related to these cards is held directly by the operating company. Countdown has also for a number of years been operating a customer loyalty scheme which means a customer database that could be linked to recall activities also exists.

Also, of possible significance is the fact the till receipt recorded only the sale of "Strawberries NZ PP 250g". This description contains none of the individualised data that was ink jet printed onto each punnet. In the event of an incident reported by a customer, the accuracy and speed of a traceback would depend on whether the customer still held the punnet at the time of making the complaint. If not, the best information they could provide would be that they had purchased the strawberries at Store X on day Y at about time Z. Depending on how the store kept its sales data and how many brands were on sale at the time, this could mean that individual identification of the product would not be possible, and maybe even the brand (and therefore grower) could not be identified.

Conclusions

Punnets of strawberries purchased from a supermarket were successfully traced back by the grower to the batch and field, albeit via a manual process in a short time-frame. However, should a larger scale traceback be required by more than one grower the required work becomes exponentially bigger. 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 the data was consistent across the whole of the Supply Chain.

4. Interim Grower Survey Analysis

As part of milestone 2, an online survey was developed and published in October 2018. This survey targeted fresh produce growers to understand their current practices and understanding of Traceability. The purpose of the grower survey was to:

- Promote project awareness.
- Gather opinion and feedback on how Traceability operates in the fresh produce industry.
- Collect information on Traceability systems currently in place.

An interim summary analysis is presented in this report from the first 40 respondents (up until the end of January 2019) to show indicative trends. It is noted that the summer months are the busiest for growers and therefore the survey remains open to enable the project team to capture as many responses as possible. Growers can access and complete the survey via this weblink: https://www.surveymonkey.com/r/R7G8B9H.

Methodology

An online survey was created using Survey Monkey. The survey included a total of 18 multiple choice and text-based questions. These questions were centred around why Traceability is important, Traceability and labelling systems, how product is distributed, recall plans, withdrawal participation and challenges. A further 5 questions covered demographics and requests for further updates. It is noted that for most questions more than one answer could be selected as growers may use different methods for different products.

The survey was sent out in October 2018 and will be available until June 2019.

Details about the project and survey were sent to recipients drawn from mailing lists supplied by United Fresh. In addition, requests were sent to Horticulture NZ and the industry Sector Groups, Foodstuffs growers, The AgriChain Centre and GS1 to promote the survey and request growers to complete the survey. There is in some cases more than one respondent per company. At this stage differences within companies were not examined.

The following results are based on the first 40 respondents and provide an initial window into current grower Traceability practices.

Results

Over 90% of growers believe that Traceability is important (Figure 15). The majority (>80%) of respondents believe Traceability along supply chains matter because it is 'required to support product recalls' and for 'Food Safety purposes'. Less common reasons were 'meeting customer requirements' and 'for record keeping purposes', and a minority believe that Traceability matters so 'I get paid for my product'.

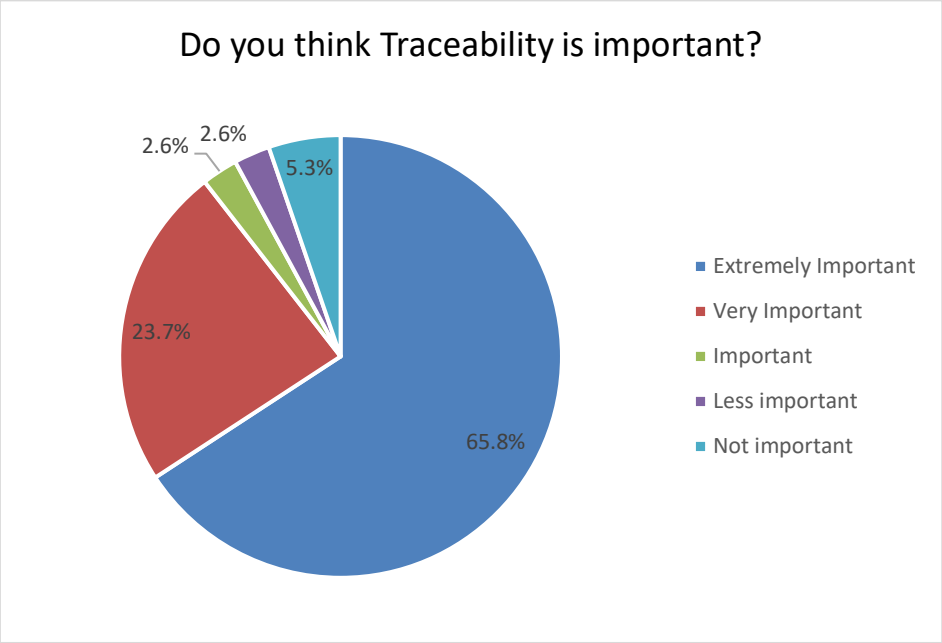


Figure 15

The majority keep Traceability data primarily because the customer requires the data to be kept. In addition, many said that it is important to their business for other purposes such as stock management and calculating yields (i.e. administration rather than Traceability).

Less than 40% of respondents keep Traceability data for legislative requirements. Of the 10% that do not record any Traceability data - half have a recall plan in place - suggesting a misunderstanding of the term Traceability data, as recall plans require Traceability data to be kept.

More than 60% of respondents supply their product in both pre-packed and loose formats (Figure 16). For the 80% of product that is pre-packed, over 60% of the respondents are packing in their own packhouse - indicating that the majority of respondents are growers/producers. Approximately 10% send their product to a third-party packhouse.

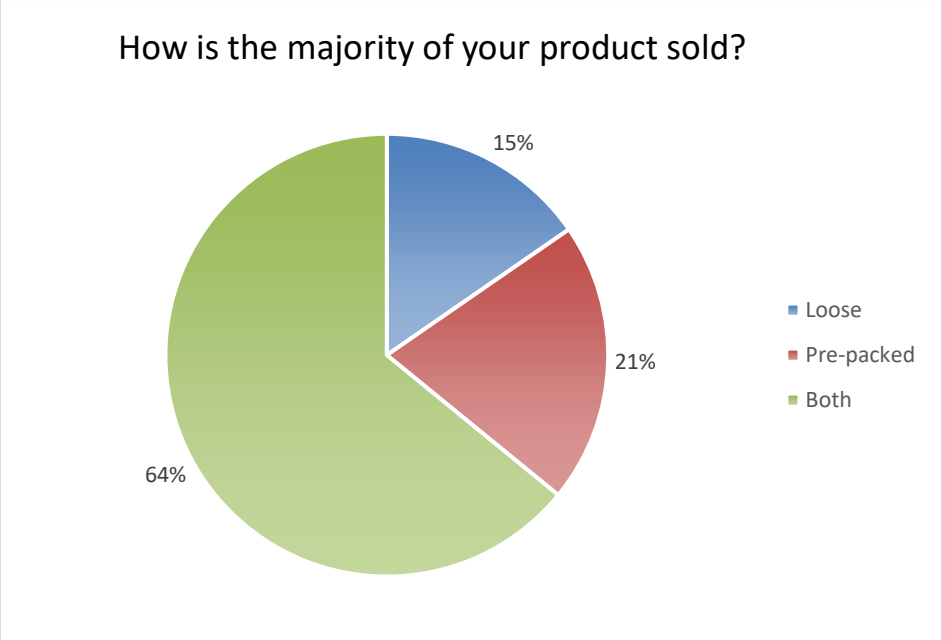


Figure 16

The majority of respondents sell via a wholesaler (Figure 17). Other customers are supermarkets and independent retailers. A minority sell through their own store, farmers markets, online or another channel. Over half of the respondents supply via multiple distribution channels.

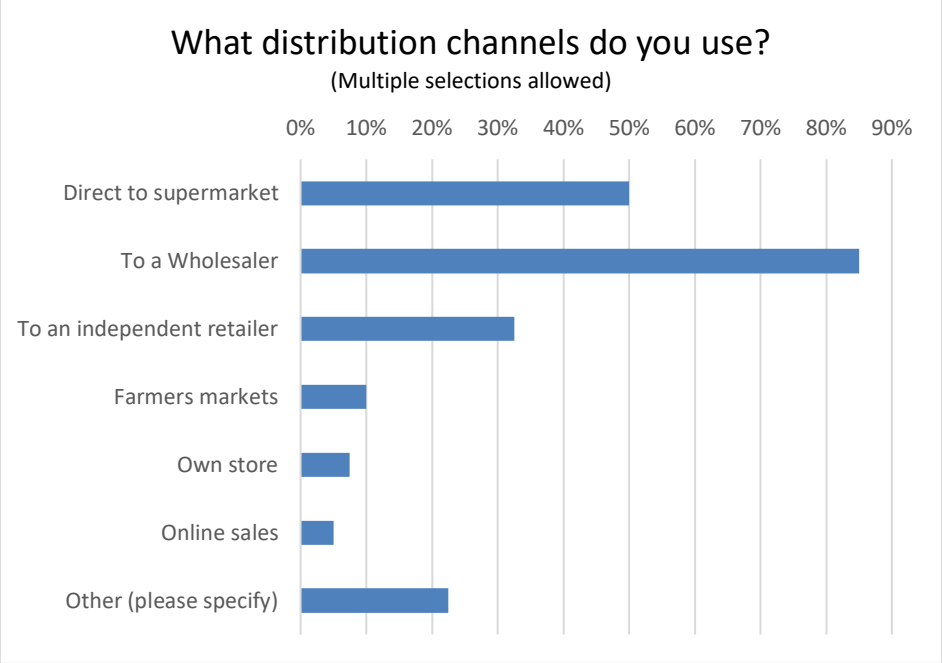


Figure 17

Respondents are selling both loose and pre-packed product. For pre-packed product, some respondents are selling some product with non-standard identification and a barcode provided by a wholesaler/retailer and some respondents are GS1 members licensed to use GS1 identification (GTINs) and GS1 barcodes owned by themselves (Figure 18).

Of the 50% that said they use GS1 numbers and barcodes, in a previous question, less than 25% of that number said they use GS1 standards for labelling their packaging and the barcode is owned by the wholesaler. The survey results do suggest that there may be some confusion over what GS1 barcodes are.

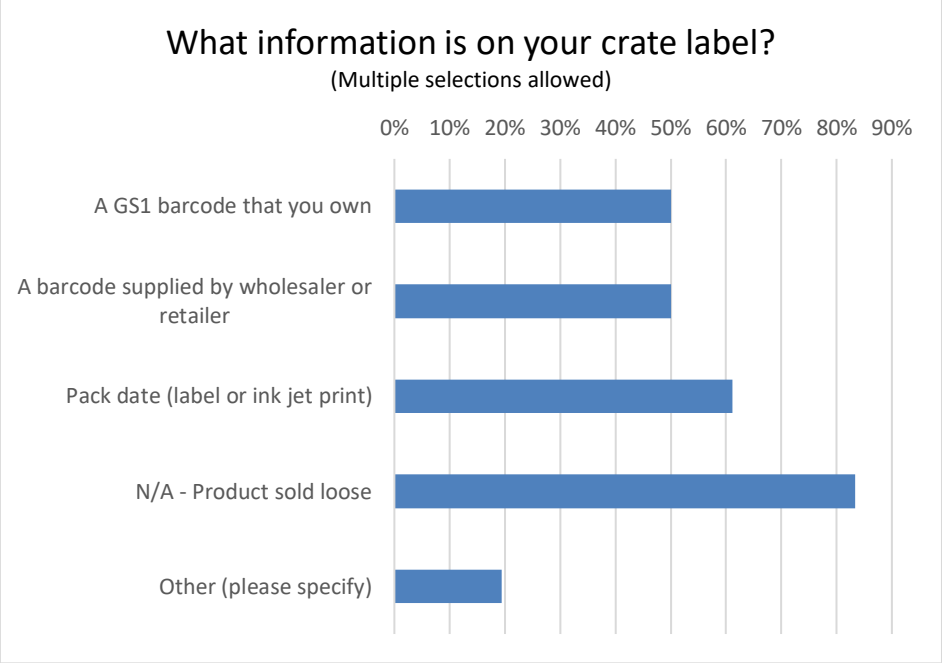


Figure 18

Over half of the respondents have the pack date on their outer packaging (the majority have printed the label in-house). It was approximately a 50/50 split between pre-printed labels and printing their own on an 'as-required' basis. There was no obvious differentiation for own printing or pre-printed reasons with respondents responding equally for 'simplicity', 'cost-effective', 'saves time' and 'use of technology to streamline the system'. The majority of 'own-print' users were due to logistics and client requirements.

Labelling is crucial for Traceability. Whilst a few do not label the outer crate, many are using a mix of 'own' labels/crate cards (70%) and 'customer defined' labels (32%). Based on the percentages, some growers may label multiple ways depending on the client requirements. Of the minority not labelling, they also do not keep any Traceability data.

Looking at who determines the label details, it is predominantly defined by the customer (wholesaler or retailer) or the packhouse is providing the label (Figure 19). Just over 30% use an internally designed label - the majority of which are based on customer requirements. Less than 20% of respondents are using GS1 barcoding standards, which they say is required by their customers' requirements.

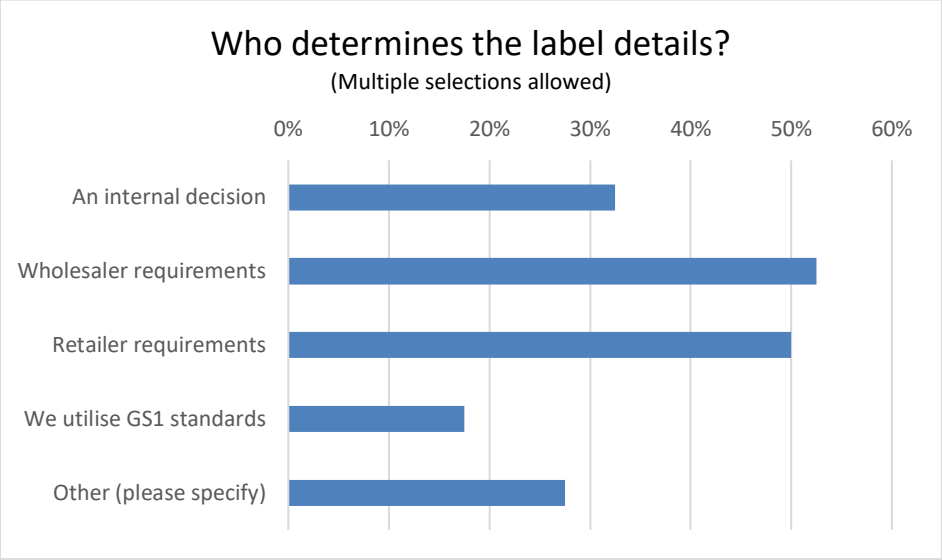


Figure 19

Only a few respondents have ever been involved in a genuine recall (microbial, labelling, chemical/residue or physical contamination). Most have only been in either a mock recall (45%) or never been involved in any sort of recall (35%). Of those involved in either a real or mock recall, i.e. time to identify where the product went, in the supply chain, was split evenly between minutes and hours. Most respondents had a recall plan in place or are registered with Product Recall NZ[4] (Figure 20). Of those that don't have a plan, none have been involved in a recall scenario.

[4] https://www.gs1nz.org/services/productrecallnz/

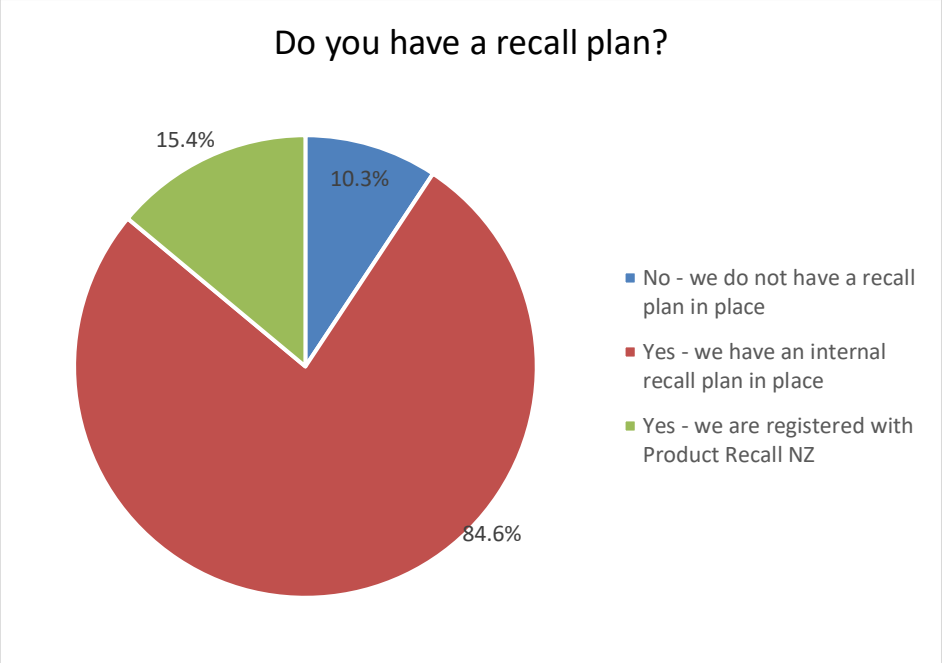


Figure 20

Nearly all respondents said it was, or felt it would be, easy to contact supply chain partners in the event of a recall or withdrawal. Difficulties encountered with recalls included incompatible technology, incorrect or insufficient records, language barriers, international time zones and dependency on others in the chain.

Summary

Respondents ranged from small growers to large growers. Most believe Traceability is important for supporting recalls, Food Safety, and stock management. Less than 40% believe Traceability is required for regulatory reasons.

Most respondents use some form of label. Some design their own labels, a few have clients who design the label and a very small percentage do not label at all.

Sales channels vary with most respondents selling to wholesalers, some direct to supermarkets or independents and a few via their own stalls.

Significantly more product is being sold 'packaged' than loose. Crate labelling is split between pre-printed labels and on-demand printing. Over 50% use barcodes either provided by the client or owned by themselves.

The majority of respondents have recall procedures. The time and ease to conduct recalls is generally acceptable to the grower. Challenges faced include technology compatibility, record completeness, language barriers and time differences.

5. Retailer Traceability Assessment

As the Strawberry Traceability Study evolved, the project team realised that an understanding of how a retailer managed produce Traceability within its environment would not only 'close the loop' in terms of the team's understanding in relation to project delivery but would also aid in developing more robust recommendations at the conclusion of the entire project. The outcome of the first retailer Traceability assessment conducted is summarised here in table format.

Date	Tuesday 22nd January 2019
Organisation Information	**Foodstuffs North Island Limited** 81 Pavilion Drive, Mangere, Auckland 2022 Neil Stewart <neil.stewart@foodstuffs.co.nz>
Assessment Team Information	United Fresh Project Team Anne-Marie Arts <amarts@agrichain-centre.com> Yvonne Gao <ygao@agrichain-centre.com>
Objective	• To understand current fresh produce industry practices and see how they align with internationally accepted Traceability systems. • To explore what learnings, we can take to help the United Fresh SFF project over the next 3 years. GS1 Global Traceability Compliance Criteria for Food Application Standard Release 4.0.1 Dec 2016 is used in this assessment as a consistent reference to help with understanding industry Traceability systems.
Scope	The scope of the assessment covers all operations within this business, ranging from produce receipt to dispatch. All food products handled within this business are included in this assessment.
GS1 Membership	Yes
Organisation Background Information	Text redacted
Accreditations	Text redacted
Assessment Observations	Text redacted
Recall Information	Text redacted
Barcodes	Text redacted
Unique Supplier ID system	Text redacted
Process Flow	Text redacted
Monitoring & Training	Text redacted
Comments	It is noted that Foodstuffs current system is working for their business.

Areas we identify as blockages to smooth industry Traceability are:

- The Foodstuffs process provides robust internal Traceability from inwards goods to store from a product and distribution viewpoint. The issue is that the grower / broker labels on the crates at receipt into the DC are carried in to store. However, the process does not allow full Traceability by delivery / lot / crate to be recorded from the source right through the supply chain. Several days' supplies from a grower could possibly be in store at the same time in the case of an industry wide recall. By this we mean, Traceability information on crate labels from growers or brokers is not fully captured at DC when products are received. In the case of an industry wide recall, tracking product from consumer back to the grower and identifying specific block, pack on date, or batch number from fields and packhouses could be difficult.
- There is an opportunity to use Pallet tracking (using GS1 pallet labelling standards) which would also track crates.