



TRACEABILITY AND RECALL STANDARDS

FOR THE PLANT PRODUCTION SECTOR



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1. EXECUTIVE SUMMARY

Traceability is defined as the ability to follow plants or a group of plants from one point in the supply chain to another.



Traceability and recall systems are a key component of New Zealand's biosecurity system, not only to identify the origin of products, but to enable faster tracking and better decision making in a crisis investigation.

New Zealand's biosecurity system has a framework of traceability systems that are widely adopted and supported by government and industries. These vary in terms of their sophistication and the extent to which they are utilised, but they are an important part of the security and integrity of our primary industries.

The plant production sector is working, through its industry biosecurity certification schemes to encourage the development of an effective traceability and recall system for the sector.

Traceability outcomes and benefits are only realised when all sector participants execute the required standards. Learning from the experience in the horticultural production sectors, livestock, and food sectors shows that implementation of a full traceability system has a high degree of complexity and takes time.

The horticultural sectors began their journey into traceability standards and systems over ten years ago. The review of the NAIT system similarly found a ten-year time frame was needed to fully embed animal traceability systems into farming operations and supply chains to the point that the benefits could be seen.

The implementation of biosecurity standards in the plant production industry is an opportunity to develop a strategy to help producers implement traceability systems. This report provides recommendations on the options that biosecurity schemes might adopt to achieve this. Recommendations are presented on how a traceability system should be defined and implemented and how to address the capacity-building requirements, particularly considering the needs of small nursery operators.

Recommendations for operational implementation of traceability in the plant production sector.

The purpose of this document is to provide insights and recommendations for the implementation of traceability standards and systems in the New Zealand plant production industry. This document is not intended to be a traceability standard. It is a discussion document that will lead to the development of standards in the future.

Summary of findings from this report

1. There is a broad range of current capability in traceability and recall, ranging from excellent to inadequate.
2. The main areas of demand for traceability in plant production are for:
 - Certified fruit & vine plants, certified to sector standards;
 - Eco-sourced plants and seed collected from specific regions / locales.
3. Building traceability and recall capability across the wider plant production sector requires improved record keeping practice.
4. Plant producers respond to customer specifications and demand.
5. The Plant Buyers Accord will help to drive demand for certification and traceability.
6. The implementation of new biosecurity standards is an opportunity to develop a strategy to help producers implement traceability systems.
7. Implementation of a full traceability system has a high degree of complexity and takes time.

Principles

The following principles inform the development of a traceability system for plant production. The Traceability and Recall system must be:



Reliable

information is accessible, while commercially sensitive data, or data which provides a competitive advantage is protected



Achievable

information is accessible and available for a range of purposes
utilises existing systems and technologies
manages risk with the benefits outweighing the costs



Adaptable

the traceability system is outcome-based and adaptable
the system can incorporate a range of activities and materials
ability to adopt new systems and technologies if required

IMPLEMENTATION



Implementation of a traceability standard will need to address the capacity-building requirements for the NZ industry, particularly considering the needs of small nursery operators.

An implementation plan has been designed that will grow industry awareness and commitment to traceability over time by:

- Developing a traceability toolkit, so that traceability is easy to implement early in the programme;
- Providing capacity building initiatives for businesses and particularly those lacking adequate infrastructure to implement and use traceability systems;
- Encourage the adoption of new technologies for data and information management.

Electronic inventory management systems currently exist which would immediately improve on paper record keeping. However, such systems have high up-front costs, as well as monthly or annual software licensing fees, and require a significant investment in staff training. It is recommended that basic traceability systems are implemented to begin with and we strengthen capability to support chain of custody across the full supply chain over time.

TRACEABILITY SYSTEM FOR BIOSECURITY CERTIFICATION – A 10 YEAR PLAN

		Year 0	Years 1 -2	5 – 10 years	10 years +
Areas of focus	Issues	What we have now	Build, Communicate and Align	Develop, Deliver and Embed	Where we want to be
Traceability system tools		Advice in Guidance documents	Develop a traceability toolkit and standard	Design the Master data system	Master data system in place
Grow awareness and commitment to traceability	Computer literacy	Mixed capability	Implement simple traceability toolkit (paper/spreadsheet)	Technology training and development to improve computer literacy	System can operate with basic computer literacy
	Cost of implementation	Low	Low	Moderate	Balanced cost/ benefit
	Professionalism	Mixed	Business & Inventory management tools	Track & Trace	Chain of custody
	Customer demand	Low	Develop a Plant Buyers Accord	Implement Plant Buyers Accord	Strong
Certification	Used by fruit & vine sectors currently	Certified plants, e.g. grafted grapevine standard	Start with certification of propagators (GOL), growing on. Develop eco-sourcing standards	Certified eco-sourced germplasm Certified producers	Certified producers (all)
Traceability system capability	What, When, How to Record	Wide range of approach	Batch recording, Reception & dispatch, Paper records okay Identify germplasm source: seeds, cuttings, TCs Identify producer Distribution to supply chain	Batch records, Reception, Processing, Mixing/Grading & dispatch, Electronic records Track and trace systems – one forward, one back	Batch records, Reception, Processing, Mixing/Grading & dispatch, Integrated systems Chain of custody across whole of supply chain
	Accuracy and Speed of data retrieval	Low to high	Seek improvement on status quo	Moderate to High	High
	Interoperability of systems	Low	Low	Moderate	High
Industry standards	Integrated standards		Nursery Register of Competent input providers	Certified inputs or providers: compost, potting mix, pots etc.	Integrated supply chain

2. INTRODUCTION

Traceability in plant production is: *The ability to follow nursery inputs, plants or a group of plants from one point in the supply chain to another.*

Traceability for Biosecurity

Plant pests, disease, weed seed contaminants, invertebrate and vertebrate pest organisms may be spread through the movement of plants, people, vehicles and machinery.

The ability to effectively trace plant material is critical to identify and isolate high-risk material that is associated with a biosecurity or other incident.

If the origin and downstream impacts of the incident cannot be traced quickly and accurately, there is reduced ability to control the spread of pests and the biosecurity incursion has the potential to impact an entire sector, or even extend to other sectors.

Good traceability systems allow products to be traced, through all stages of production, processing, and distribution, including importation and through to the next point of contact.

They provide an effective way to isolate, withdraw, or track plants back to their origin and can limit the scope and cost of recalls to suspect product only.

Traceability and integrity

Traceability systems can enable products to be recalled or withdrawn, but they can also provide other commercial benefits and opportunities to businesses who adopt them.

Traceability standards play an important role in incentivising good practice and improving performance. They support the integrity of claims being made by a supplier about the practices or standards that have met during the production processes, particularly where monitoring, testing, auditing or specific treatments that are not visible on the physical plant, have been undertaken.

The ability to accurately identify plants from certified producers and preventing them being mixed with other producers' plants is an important part of the integrity of the supply chain.

Traceability standards are also a critical component of assurance and certification schemes. They enable the origin and certification status of products to be identified back to its origin when they move between sites or change hands at any stage in the supply chain.

Used in this way, traceability systems can enhance and maintain the confidence of plant buyers, consumers and government, by identifying plants that meet biosecurity and other standards.





Traceability and improvement

Traceability systems can also be used to improve inventory management in the nursery, speed delivery of orders to retailers and distributors/operators, identify process improvements and provide better business intelligence regarding customer needs.

Tracking outcomes of recent incursions in New Zealand

The performance of the traceability framework in the nursery sector has been tested during recent biosecurity crises, including the Myrtle Rust incursion (2017) and the USA Post Entry Quarantine Pipfruit and Stonefruit Response (2018). Each issue is discussed in further detail below.

The events highlighted the varying capabilities in nursery record keeping, leading to different traceability outcomes. Traceability outcomes and benefits are only realised when all sector participants execute the required standards.

The speed with which accurate records could be retrieved was a key determinant in the success of the incursion response.

Myrtle rust 2017

- i) The New Zealand biosecurity response to myrtle rust (*Austropuccinia psidii*) required extensive tracing in the early stages of the response. Its detection in New Zealand coincided with the seasonal mass distribution of myrtaceous plants from commercial nurseries into contracted planting programmes.
- ii) Plant movement has been suggested as a major factor in the spread of myrtle rust in Australia, and there was a risk of plant-related spread of the fungus occurring in New Zealand before strict movement controls were established (Toombe-Heller *et al.*, 2020).
- iii) At a minimum, what was needed for successful tracing were records that would enable 'one step forward one step back' of plant material through each stage of the supply chain. Not all nurseries demonstrated minimum record keeping.
- iv) There was a range of record-keeping capability across nurseries. Some nurseries operate well-defined systems for managing their stock and inventory, and systematic record-keeping enabled all potentially affected production to be quickly and accurately tracked.
- v) In other cases, a lack of a well-defined approach to record keeping made it very challenging to determine where plants had originated from and been consigned to. With no ability to trace or recall, this created a high potential for failure to mitigate or contain the spread of the fungus through nursery stock pathways.

Accuracy: No sector standard mandating traceability record-keeping and a range of record-keeping practices were observed. These ranged from no ability to trace forwards or backwards, to the ability to trace through manual paper records, spreadsheets, and electronic records (HortBase). Some potential for manual errors during record keeping to be expected.

Speed of data retrieval: Ranged from an inability to retrieve records, to retrieving records manually, within a few hours to a day, to retrieving electronic records within a few minutes to an hour.

USA Post Entry Quarantine Pipfruit and Stonefruit Response 2018

- i) An MPI audit of an USA offshore facility in March 2018 found several gaps in record keeping of disease testing results for apple and stonefruit varieties, which had been imported into New Zealand over a period of six years.
- ii) These missing test results threw into doubt the biosecurity status of imported plant material which had been cleared from post-entry quarantine in New Zealand and distributed to plant nurseries for graft budding and multiplication.
- iii) Almost 48,000 apple and stonefruit trees were affected, which were distributed across 50 sites in Hawke's Bay, Waikato, Nelson and Central Otago. Excellent record keeping by fruit tree growers enabled MPI to rapidly identify the source and location of all 48,000 young trees, which had movement controls placed on them and held in situ while decisions were made about further testing and possible destruction.

Accuracy: Disciplined record-keeping practice with some potential for manual errors during record keeping. There is no sector standard mandating traceability record-keeping, however records are kept for PVR licensing & royalty payment purposes.

Speed of data retrieval: Records were readily retrieved within a few minutes to an hour, with all records received within a day.

Traceability Systems in the Horticulture Sectors

New Zealand primary sector producers have adopted and utilise traceability systems to a high degree compared to many other countries. Traceability requirements are part of industry sector quality management standards, used for food safety, supporting market access, and preventing the spread of pests and diseases.

Traceability schemes are common amongst suppliers to the horticulture production sectors, including:

- Kiwifruit Plant Certification Scheme – Kiwifruit Vine Health
- Grafted grapevine standard – NZ Winegrowers
- NGA High Health Scheme – NZ Avocado Growers Association
- Strawberry High Health Scheme – NZ Berryfruit Propagators

These standards and schemes certify plant material and require information to be maintained throughout the plant's nursery life cycle. More detail about these schemes can be found in Appendix 2 of this report.

Participants in these schemes can differentiate their plants in the marketplace, according to the standards that have been met during the production and distribution processes.

Other programmes where traceability is part of an overall systems management approach, include:

- NZ Good Agricultural Practice – Farm Assurance Programme (Appendix 3.);
- GLOBALG.A.P Farm Assurance Scheme

The Plant Production Biosecurity Scheme (PPBS)

The PPBS is a science-based framework developed as a pilot programme in 2019/20 to help producers identify, manage and avoid biosecurity risk. In doing so, they provide assurance that their plants have been raised in conditions that minimise the introduction and spread of pests.

The PPBS is intended to be a quality management system specifically developed for New Zealand plant producers. It requires record keeping at every stage of production, including propagation production records, monitoring and inspection records.

Section 7.4 of the PPBS Guidance document includes the following guidance on best practice traceability:

- Good traceability records will enable quick access in the case of a pest incursion either in the nursery, at one of the nurseries suppliers and/or at one of their customers.
- To facilitate this, plants should be batched to at least species level from the start of the production process (and to cultivar level where applicable). This allows a biosecurity issue to be traced back to source and forward to identify what and where else the issue might impact.
- Start “batching” at seed, cutting or other material collection steps, and upon the receipt of plant material from another nursery.
- Each production batch should be identifiable through each production step.
- Keep batches of plants together. For example, if you are propagating a single cultivar or seed line over a several days, treat each harvest of cuttings (or at the very least, each day’s work) as an individual batch. When the potted, treat them as separate batches. When the plants are harvested keep records of each batch.

For the purposes of traceability, nursery records should facilitate rapid recovery of data to show where propagative or young plant material came from for any given batch.

The minimum traceability requirements set by the PPBS are likely to be already being met by many plant producers in the ornamental supply chains.



3. A TRACEABILITY SYSTEM FOR THE PLANT PRODUCTION SECTOR

The sale and movement of plants through a direct transaction between a plant producer and a buyer is standard, however online sales and brokering are increasing, particularly in ornamental and indigenous plants. This presents new opportunities and challenges for traceability.

The movement of plants through the supply chain from producer to customer is most often direct. However, increasingly, plants are aggregated or consolidated from multiple suppliers into one or more consignments during the distribution process.

Regardless of the method of sale and distribution, the integrity of the certification status of certified plants must be retained through all steps of the supply chain. This means that each participant in the supply chain must be able to identify the supplier and the customer of the product.



What to trace

At a minimum, a plant traceability system allows plants to be traced one step forward (to immediate customers) and backwards (to suppliers).

MINIMUM PLANT TRACEABILITY SYSTEM



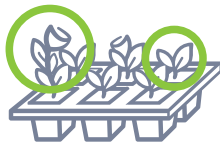
It is not necessary for every plant in a production batch to be individually serialized, though some horticultural and food traceability systems do this for certification purposes. Traceability can be established at the production batch level, with each batch treated as a single item for recording and tracking purposes. Each production batch needs to be uniquely identifiable within the producers' system, allowing straight forward traceability should a problem arise downstream.

Identifying units

Key considerations when deciding on how to identify traceability units in the plant production sector are:

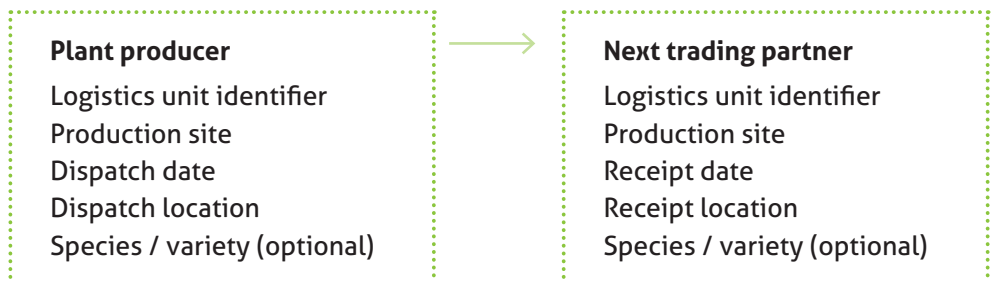


Unless in sealed boxes or cartons, plants are normally visible and therefore readily identifiable in terms of the type, species of plant. This information is therefore not required to be printed on a traceability label.



However, if a variety, or other unique feature of the plant is important to the customer, this may be included on the traceability label.

Packing reference information, such as delivery dockets, should include the corresponding traceability information.



Traded or consolidated product

Traceability becomes more complex when producers buy in plants from other producers, such as starter plants for batch production, or to supplement their own production numbers or meet a customer order. Product sourced from other nurseries, particularly where the plants are consolidated into a new batch, should display information or codes that identify the place(s) of production. This information should be consistent with electronic or paper-based data related to the product.

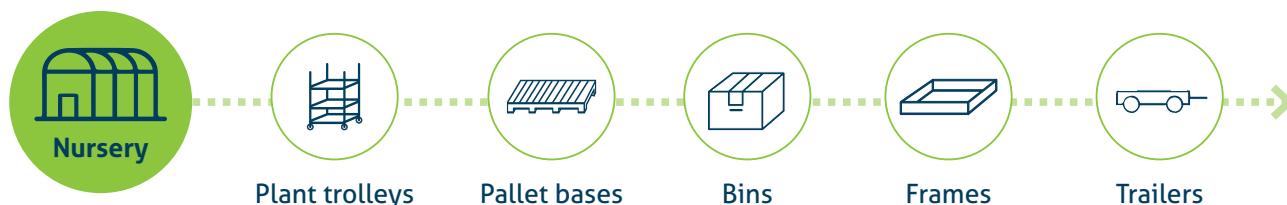
Record keeping must be sufficient to link dispatched orders to a customer order or invoice, and allow plants at point of sale to be traced back to production area. To achieve this, good labelling of dispatched plants, cartons, units is required, as well as details of conveyance of plant material between nurseries.

Information, such as special treatments, varieties, certification status etc, should be included.

Delivery / logistic units

Logistics units coming from nurseries include plant trolleys, pallet bases, bins, frames and trailers. Each unit must be individually traceable, such as with a label that shows the supplier, or place of production. This may be the name of the nursery, an identification code, or reference number. Identification codes may be used to identify individual consignments, or distribution units.

LOGISTICS UNITS THAT MUST BE TRACEABLE



What to record:

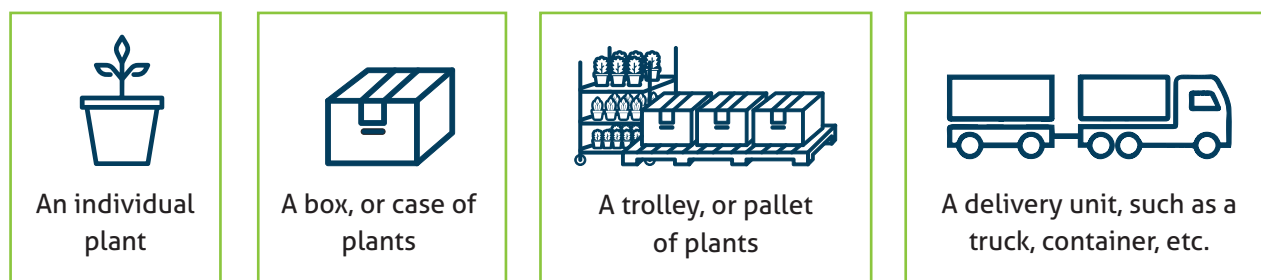
Each certified business must have a unique identifier that is related to the main certification register. This identifies the business that produces or handles the plants. In addition to this, each production or handling site requires a unique way to name or identify each of the production or handling suites in the business. This may be a site name, a location number, code, or a Global Location Number. This name or code must be identifiable to other participants in the supply chain.

Simple batch identification records are all that is needed to establish traceability to the production batch. Industry standards may require more detailed records to be kept for each batch production, such as the supplier of nursery inputs (e.g. growing media), dates of potting & re-potting, fertiliser and crop treatments. These records help to narrow down or identify the potential source if a biosecurity, or other issue affecting the batch is identified downstream.

Some producers have inventory management systems which assign alphanumeric identifiers or barcodes to a production batch. In all cases, the unique identifier, quantity of plants and date of production becomes the key data which needs to be recorded and maintained through production and/or reception, during processing (including location in the nursery, mixing/grading), and dispatch to the customer.

Labelling system:

The supply chain partners, or traceability standard owner, should agree on the traceable unit that is expected to be traced. The traceable unit is the physical item that moves through the supply chain, for example:



The traceable unit must be uniquely identified with a label that can be read, scanned, etc by other participants in the supply chain.

If a traceable unit is reworked, unpacked it must have a new identifier attached. The new unit must relate to the original unit(s), e.g. by recording the original identifiers.

Traceability information, such as a label or scannable tag, must remain attached to the unit until the unit is no longer in use, i.e. fully unloaded in the case of a plant trolley or pallet.

When to record:

To achieve traceability through the supply chain, certified plants and associated documentation must be able to be tracked back to their point of origin.

The identity and certification status of plants, mixing plants that originate from a certified site of production with plants from an uncertified site must be avoided.

Each batch, or consignment of plants must therefore be clearly separated in the supply chain, physically and with records and documentation clearly relating to a readily identifiable batch.

Producers need to keep records of who they have bought plants in from, when and how many, as well as keeping records of who they have distributed plants to, when and how many. Likewise, their customers need to keep records of whom they have bought plants from, when and how many.

These records can be kept through transaction receipts, such as purchase orders, invoices, and receipts.

Segregation

To avoid the loss of certification status it is recommended that plants from certified and uncertified production should be separated physically.

Certification status

The certification status of plants may change through the supply chain where plants from multiple sources are aggregated or consolidated.

The certification status of the plants in an individual batch is the lowest status of any plant in the batch. For example, if one or more plants in a batch are from a producer that is not certified, then the entire batch of plants is considered to be uncertified.

Plants from an uncertified production site cannot become certified by being combined with certified material, or because they have been handled or distributed by a certified producer. The certification status of plants is determined only by the status of the production site.

Managing the certification status of plants

In order to maintain the certification status of plants through the supply chain, mixing of plants from certified and non-certified sources must be avoided.


In this model the mixing or consolidation of plants from two or more certified producers is allowed, where documentation and markings provide evidence of the source and certification status of the plants.

- There are no restriction on the mixing of plants from multiple sources at any point in the supply chain.
- While plants that are added to a batch or consignment may be relabelled or rebranded, documentation and markings must enable the certified plants to be tracked back to the original source.
- Plants that are not certified may be consolidated and mixed with other non-certified plants.
- Batches of certified plants must be kept together in a group and physically separate from non-certified plants through the supply chain.
- Where any non-certified plants are mixed or consolidated with certified plants, all plants in the new batch default to the lower certification status of any plant in the consignment.

Claims and markings.

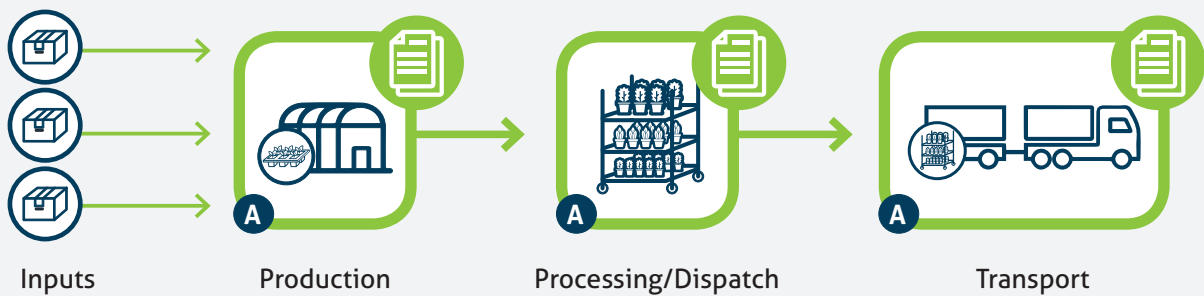
Plants that have undergone specific treatments, inspections, or testing processes should be labelled accordingly, supported by documentation about the specific treatments.

Scenario 1:


 Certified plants

Certified plants from a single certified source are delivered directly to one or more customers. If the certified plants are segregated through the supply chain, all plants retain their certification status.

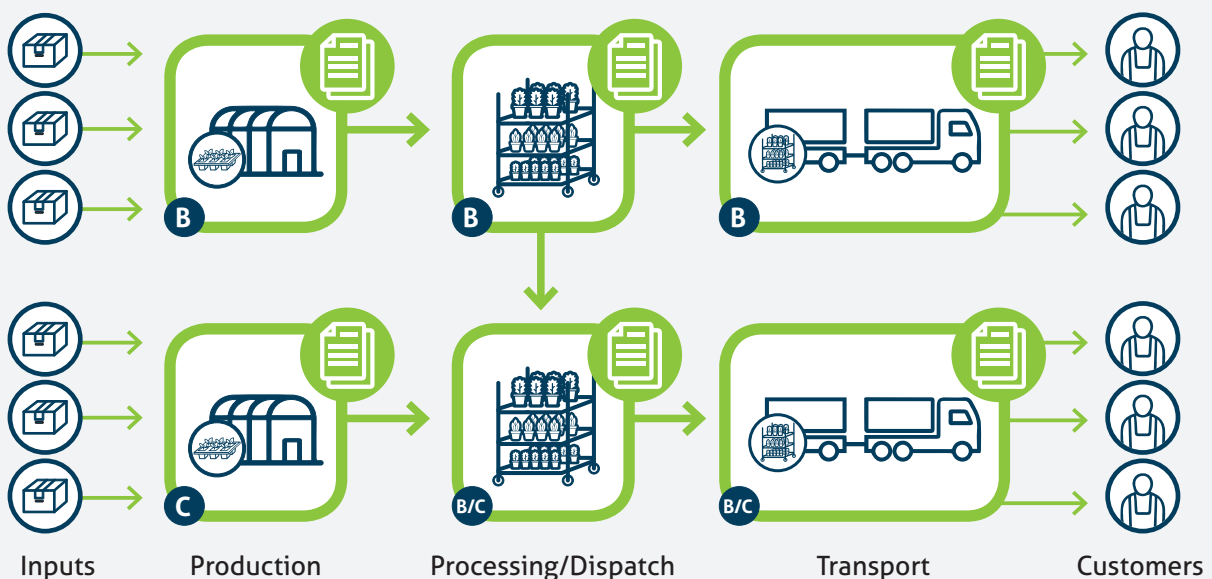
CERTIFIED PLANTS AND DOCUMENTATION



Scenario 2:

 Certified plants

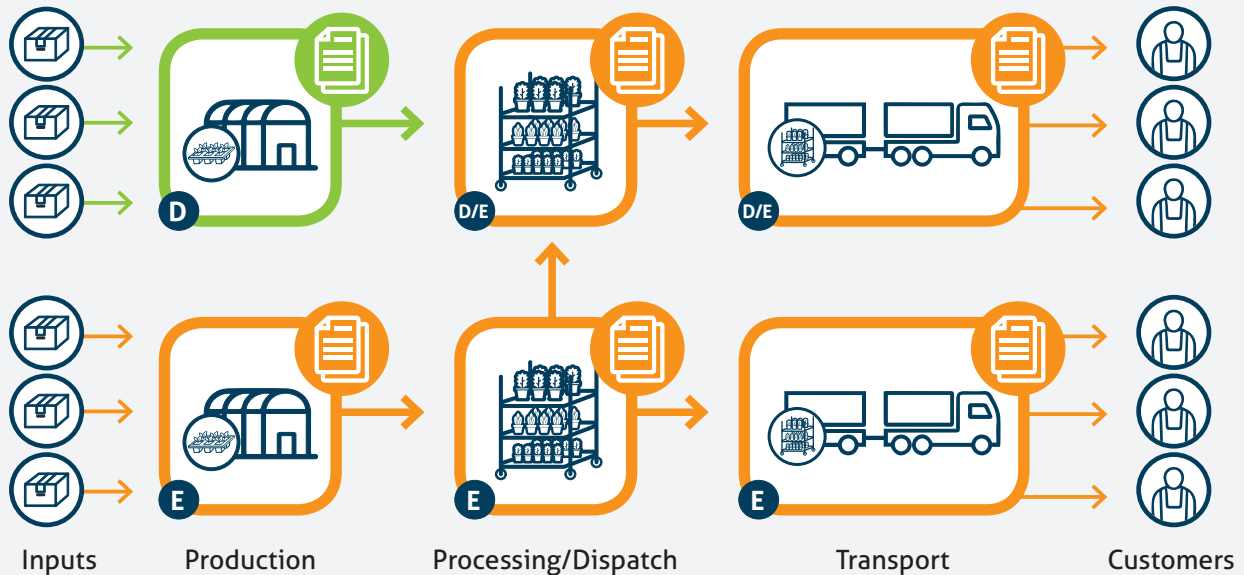
Certified plants from multiple certified sources (suppliers B & C) are mixed at various points in the supply chain before being delivered to one or more customers. In this scenario all plants retain their certification status. Supply chain documentation must include the sources of the plants in each batch or consignment.



Scenario 3:

□ Certified plants □ Uncertified plants

Plants from certified (D) and non-certified (E) suppliers are mixed at various points in the supply chain before being delivered to one or more customers. In this scenario all plants default to a non-certified status. Supply chain documentation should include the sources of the plants in each batch or consignment.



How to record

There is a range of capability across the plant production sector for record-keeping, from those keeping mostly paper records, to businesses operating spreadsheets, databases and specialist software packages such as HortBase.

In the supply chain, traceability can be achieved using humanly readable labels, to machine readable identification and data capture. The benefit of machine-readable systems is speed. Data can be captured on simple devices that are freely available, like a barcode scanner or smartphone, which makes the system cheap and flexible to use in remote locations.

New track and trace technologies are available which allow tracking during distribution. NZ Plant Producers Inc. is currently applying RFID (Radio Frequency Identification) tags to its trolley fleet in the NZPPI Plant Trolley Scheme.

The tags make wireless non-contact use of radio-frequency electromagnetic fields to automatically identify and track tags attached to objects. The tags can provide tracking points to identify when trolleys are loaded onto a truck and when they come off a truck, using the transport network tracking systems.

The most commonly used data carrier today is the one-dimensional barcode. The above data carriers require line of sight when scanning them. Automation helps take some of the effort out of recording, but it is more expensive to implement and may not be accessible to all nursery operators.

A potential challenge to machine readable systems is the interoperability between different businesses, i.e. businesses upstream or downstream making sense of each other's tracking and traceability information.

HortBase

HortBase is a New Zealand developed software system used by plant producers for inventory management, production planning, plant labelling and financial management.

It can:

- track production of plants from planning to saleable stock
- generate production schedules for propagation, growing-on and potting stages
- allows producers to calculate the material requirements for each production stage and budgeting of available space
- produce plant labels, packing slips, price lists and catalogues
- manage sales orders, including saleable stock and indented orders (forwards orders)
- manage the filling and dispatch of customer orders and facilitate the tracking for forward and back orders.

Record retention

Maintaining records will enable timely and accurate traceability and recall. It is recommended that individual businesses establish policies that define the way that data will be stored and the time that this will be kept. This period of data retention should align with industry standards, customer and regulatory requirements, the time that product takes to move through the supply chain or a reasonable period of time to account for the expression of pests and disease symptoms.



4. ALIGNMENT WITH OPERATIONS AND OPERATORS IN NURSERY STOCK PATHWAYS

Basic traceability systems keep records of plant movements into and from the nursery. Plants need to be traceable one step forward (to immediate customers) and backwards (to suppliers).

More detailed record-keeping of day to day operations in the nursery and other supply chain operators could enable sources of possible contamination to be identified, such as inputs into the production process, or cross-contamination during shared transport.

Records could include:

- Distribution of plant material across different sites owned by a commercial operation and the record of movements: i.e. various stages of growth;
- Nursery management and hygiene practices, including fungicide and insecticide applications, incidences of previous disease expression and disposal method;
- Location relative to host material and other commercial plant operations;
- Documentation by plant transport companies that identifies consignments from multiple nurseries sharing space with a truck/trailer unit.

Some producers may already be keeping some or all of these records as part of their overall quality management system. But for many, detailed record-keeping such as this will not be practically achievable with current systems or technologies and will need significant investment to attain.

Evolving and emerging technologies may provide new solutions for tracing plants through the supply chain. They have the potential to reduce the cost of tracing, and provide accurate, accessible and timely information and identification of goods. However, they are unlikely to be affordable and readily implementable for many operators in the New Zealand nursery industry.

The implications (benefits, cost and practical feasibility) of the system needs to be understood, particularly considering the needs of small nursery operators, whose capacity-building requirements may need ongoing support.



Learnings from the implementation of the NAIT scheme and other schemes is that it is important that systems can be implemented with minimal effort and with a low administrative burden. People respond individually to programmes and to be successful, a programme needs to cater for early-adopters and potentially a long-tail of late-adopters.

Operators in nursery stock pathways

- Plant Producers / Nurseries
- Transport Operators – couriers, trucking companies
- Plant brokers
- Contractors
- Receiving entities

Operations in nursery stock pathways

- Plant production – batches (lot or crop numbers)
- Ordering & receiving production from other nurseries
- Batch sorting, disposal (processing, splitting)
- Potting, spraying,
- Weed maintenance, product sorting/rejection
- Customer ordering, filling, packaging and dispatch (wholesale / retail)
- Transportation – collection, transport, plants and trolleys, trolley storage.
- Retail sale
- Landscaper holding yard – storage, planting
- Planting by end users (councils, landscapers, in restoration and infrastructure projects)

Tools

- NZPPI Trolley Scheme (RFID on and off truck movement recording)
- HortBase inventory management – batch coding, tracking, record keeping
- GS1 barcoding system – line of sight scanning equipment

Maintain records of the inputs

Plant stock
Growing media
Fertiliser
Containers
Equipment
Vehicles

TRANSPLANTING
Propagation
Tubing
Deflasking
Potting
Repotting

Record the batch

Maintain records of the inputs

Water
Fertiliser
Equipment
Vehicles

GROWING ON
Irrigation
Pest control
Weed control
Handling/pruning/training
Nutrition

Record the batch

Cartons
Pallets
Trolleys
Vehicles

PROCESSING/DISPATCH
Order pick/Lifting
Processing (bundling)
Storage
Pack

Record batches,
dispatch location & date
Delivery docket

Trolleys
Vehicles

TRANSPORT
Distribute plants

Record batches,
dispatch location & date
Delivery docket



APPENDIX

APPENDIX 1:

Scenario Descriptions of Current Traceability Practices in the sector

Nursery A – electronic recording

Nursery A is a wholesale nursery producing 600,000 containerised plants per annum. The nursery manages field, tree and container production. Most stock is propagated in-house but occasionally starter plants are brought in as tissue culture. The nursery operates their own fleet of trucks for deliveries.

The nursery operates the HortBase inventory management system which keeps track of all of the batches in production. A code or crop number is assigned to each batch and tracked through production. At any one time, there may be up to four batches of a species in the system: propagation (in a single tube /growing-on line); production stages 2 & 3; final pot size.

The batch number is noted on the final invoice to the customer, making traceability back to production quick and easy to resolve.

Nursery C – manual recording

Nursery C operates a quarantine facility and imports plants for sale into the wholesale market. Every imported batch of plants is traceable to the nursery it originated from offshore through a permit to import. Once all biosecurity requirements have been met, the batch receives a biosecurity clearance certificate and can be moved into growing on greenhouses to be prepared for sale.

It is possible for different batches of plants of the same species, imported at different times, to be intermingled in the growing house. Plants selected for dispatch to the customer may be selected from the total pool of plants available according to size and quality. Intermingling makes single batch traceability difficult, which means if a problem is discovered downstream, multiple batches of plants might need to be recalled. However the manual records kept for dispatch are sufficient to allow traceability back to the producer, whose own internal records allow identification to the original production nursery.

Nursery B – spreadsheet recording

Nursery B produces growing on lines (starter plants) for the wholesale nursery and landscape sector. The nursery was one of 20 nurseries which went through the PPBS pilot scheme and have developed tools and processes for batch traceability through nursery production.

A batch number is assigned to each production once they are tubed into the first size pot. These are recorded electronically in a Google sheet document, which is saved on the cloud and accessible on devices in the potting bay as well as in the office. The batches record the dates of tubing and the numbers.

Sales invoices and packing slips to customers are managed through the nursery MYOB accounting software. Batch numbers are not included on the packing slip because there is no integration point between the two systems in place, the spreadsheet and MYOB. However traceability can be manually resolved, using the date of the packing slip/invoice and list of plants purchased, against the production dates and batch numbers held in the spreadsheet.

Integration of the two systems might be resolvable in future through implementation of a common, cross-referencing key, however the cost of doing this might not provide any additional benefits over what can already be achieved.

APPENDIX 2:

Stocktake of New Zealand standards

With the right drivers and supported by a clear strategy, traceability systems have been successfully implemented by New Zealand horticultural sectors. Companies and plant material are identified uniquely in the supply chain, which enables specific information to be linked and connected within or between companies. Plant producers keep records of the plant material used in production and who plant material is distributed to, and likewise growers/orchardists keep records of where material has come from and where they have planted it.

Horticulture production traceability schemes

Kiwifruit Vine Health

Kiwifruit Plant Certification Scheme

The KPCS is owned by Kiwifruit Vine Health (KVH) and requires certified nurseries to be able to trace production plants, regardless of source, through the production system back to the plant supplier or the time of propagation. Traceability of plant material is a core principle of the plan to enable a trace forward and back should a new detection of PSA occur. All plant material movements are required to be recorded for this purpose and KVH audits suppliers to ensure records are kept.

The scheme requires all plants to be batched and labelled (bar code or otherwise), and traceable to budwood and rootstock, and/or seed origin. Where plant material has come from an external source, supplier details must be recorded and available. Sales and shipments must be able to be traced forwards (records must include purchaser details such as orchard KPIN), and reconciliation records held for each batch showing the amounts of propagative material gathered, propagated (as cuttings or grafted), lost in process, sold, disposed of and numbers remaining in stock.

Recipients, typically growers, are required to record all new plant material inputs and source into their Zespri GAP manual, which is independently audited. Non-compliance in these areas is passed to KVH.

NZ Winegrowers

Grafted grapevine standard

The Grafted Grapevine Standard is owned by NZ Winegrowers and covers trueness to type, virus elimination, vine health and physical specification amongst other requirements. After sale, the onus is on the purchaser to keep records of where the vines are planted on their site and to get back to the nursery (generally within a 7-14 day period) if there are any issues with the vines upon receipt. Reconciliation of plant material enables exact records of production to be kept.

NZ Avocado Growers

High-health Scheme

The Avocado Growers High-health scheme is owned by NZ Avocados and requires a documented process used during the production of a high-health plant for traceability back to the source block it was harvested from. The identity and source of rootstock, the identity and source of the scion in grafted plants, as well as the identity of the nurse seedlings in clonal rootstocks are required to be traceable.

NZ Berryfruit Propagators Strawberry High Health Scheme

The Strawberry High Health Scheme is owned by NZ Berryfruit Propagators and covers Strawberry lethal yellows and *Phytophthora cactorum*, amongst other plant diseases. Producers and growers both keep records, which are also maintained for royalty collection purposes.

Animal Sector Traceability Scheme

The National Animal Identification & Traceability (NAIT) system is the animal equivalent to the plant schemes discussed above, however it differs in some specific ways and has had a somewhat rocky road to implement. The scheme is a legal obligation for all farmers and people in charge of animals. Farmers are required by law to tag each animal and keep records of cattle and deer movements.

The scheme was established in 2012 to enable biosecurity response and preparedness, food safety and effective livestock traceability. It links people, properties, and animals, principally to trace on and off farm movements of cattle and deer. Every animal is traceable, through registration of a unique ear tag number in a database, against an owner and property/farm.

The integrity of the NAIT system relies on people keeping accurate and current information about livestock and their movements. When the scheme was first introduced, farmers commented on practical and technological issues that impacted their adoption of the system. They felt that the system was not user-friendly enough and these early experiences has clearly had an impact on the willingness to adopt and comply with requirements.

A compliance review in 2016 in response to the *Mycoplasma bovis* outbreak found major shortcomings in compliance with the record-keeping requirements of the NAIT Act and regulations was as low as 30% in some areas of the country. Similar systems in place in Australia, Ireland and Scotland, which have been operating for more than 10 years went through a similar transition. Each country underwent a development phase of several years before their systems were correctly executed and fully exploited, and only then have they produced the significant benefits that were originally intended.

A recent report by Ospri made 38 specific recommendations for improvements to the NAIT system, including legislative changes, animal identification tags, devices for recording movements, compliance, and roles and responsibilities of different parties in the system.



One of the recommendations, to review and optimise operational procedures in the field and simplify recording procedures, recognises that any traceability system needs to be minimal effort and have low administrative burden to be successful.

Traceability programmes need to cater for early-adopters and potentially a long-tail of stragglers.

APPENDIX 3:

Stocktake of Overseas plans and standards

- GLOBALG.A.P. Integrated Farm Assurance Standard - Chain of Custody
- The British Ornamental Plant Producers' (BOPP) Certification Scheme
- Farm Management System
- GS1 Global Traceability Standard
- Pierces Disease Control Programme (USDA)

GLOBALG.A.P. Integrated Farm Assurance Standard

The GLOBALG.A.P. Certificate, also known as the **Integrated Farm Assurance Standard (IFA)**, covers Good Agricultural Practices for agriculture, aquaculture, livestock and horticulture production, including a new (2016) standard for Plant Propagation Material (PPM).

It lays out strict requirements for handling certified products and for the proper segregation of certified and non-certified products during processing, which underpins the Chain of Custody.

GLOBALG.A.P. provides **checklists** for each module to help producers better prepare their farms and make the necessary changes before a certification body inspector performs an audit or inspection.

British Ornamental Plant Producers

The British Ornamental Plant Producers (BOPP) are a grower specialist group of the Horticultural Trades Association (HTA) for the UK garden industry. They run a Certification Scheme comprising three standards that set best practice for the growing and packing of flowers, plants and bulbs, and the manufacture of growing media and includes full traceability. All members of the BOPP scheme receive an annual inspection by a UKAS accredited certification body (NSF Certification Ltd).

The Grower and Packhouse standards cover Quality Management Systems, Product Development, Transport, Staff Training and Employment, Health and Safety, and Sustainability. The Grower standard is benchmarked against the GLOBALG.A.P. Integrated Farm Assurance (IFA) Standard.

A documented traceability system must be in place permitting product to be traced back to the site where it was grown and all aspects of the traceability system must be verified, if required by a customer.

Grower standard Identification and Traceability Requirements

3.7.1. Details and sources of all major crop inputs must be available. These include: -

- All growing media ingredients
- Rooting modules (pre-formed plugs)
- Bulbs / Seeds etc. (bought in and own stock)
- Plants and cuttings (bought in and own stock and rooting rates)
- Fertiliser and any sprays applied
- Records of sowing / planting method, rate (amount per cell / metre / acre) and date must be recorded
- It must be possible to demonstrate availability of details of all inputs where available.

The Grower standard also requires procedures to control non-conforming products, and to manage incidents, product withdrawal and recall. Written procedures are required for businesses to specify a designated returns / internal reject area, with procedures for returning, contaminated stock, including a designated person with overall responsibility for returned product. Information for contacting customers and dealing with the withdrawal of product and stock reconciliation are also required.

Farm Management System

Australia's Farm Management System (FMS) provides a systematic approach to production nursery biosecurity risk management. It began in 1996 with Nursery and Garden Industry Australia's introduction of the Nursery Industry Accreditation Scheme (NIASA). NIASA guidelines describe industry 'Best Management Practice' spelling out technical and management requirements. It now comprises three programmes:

1. NIASA – best practice benchmark standard and continuous improvement.
2. EcoHort - environmental stewardship and natural resource management.
3. BioSecure HACCP - biosecurity risk management for both imported and exported material.

The BioSecure HACCP programme is designed to assist growers in assessing their current and future pest, disease and weed risks, and guide businesses in the implementation of management strategies at critical control points. It seeks to identify internal and external (endemic and exotic) threats to the integrity of a business's biosecurity processes and preparedness.

BioSecure HACCP is a set of protocols and procedures that enable a business to manage biosecurity risks establishing an effective risk management processes for both imported and exported plant material. This includes mandating strict traceability of risk materials including incoming plant materials, nursery outputs, and visitors and vehicles. Form templates are provided to assist record keeping.

NIASA and BioSecure do not specify record retention period for production nurseries; just that "plant/ batch records allowing traceback" shall be available at audit. However, NIASA requires that Greenlife Markets (a common entity in Australia which act as an intermediary between nurseries and plant buyers) house records dating back five years. NIASA and EcoHort certified producers are subject to annual independent audit, while BioSecure HACCP is audited twice yearly.

GS1 Global Traceability Standard

GS1 is the most commonly used identification standard in the plants sectors globally, particularly for those items which are traded globally and require globally unique identification. It has been widely adopted by producers, logistics operators and buyers due to its accuracy, flexibility and ability for the coding system to be used in a wide range of information technology and product scanning systems.

The GS1 product identification coding system is used by many nurseries and includes a unique identifier starting with a number (0-9), and a Global Trade Item Number (GTIN) which is used to identify a product to batch level, from an individual producer. A number of New Zealand nurseries have adopted the GS1 system into their barcoding systems. GS1 also provides a system to record the production location by a Global Location Number (GLN).

Globally unique identification schemes are standardised under ISO/IEC 15459-1:2014.

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