

Travel Report: Visit to New Zealand

January 2025



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1. Objectives of the visits:

- To visit the research station of The New Zealand Institute for Plant and Food Research in Central Otago to familiarise ourselves with their research on stone fruit.
- To visit the stone fruit production regions in Central Otago and the apple production region in Nelson.
- To attend the XIII International Symposium on Integrating Canopy, Rootstock and Environmental Physiology in Orchard Systems in Napier, New Zealand to stay abreast of the newest developments in the field of tree training systems, rootstocks and orchard management.
- To build relationships with researchers, technical experts, and industry members in New Zealand.

2. Touring party members:

- Wiehann Steyn (Hortgro)
- Marno van der Westhuizen (Hortgro)
- Graeme Krige (Two-a-Day)
- Andrew van Lingen (Two-a-Day)
- Pierre du Plooy (Two-a-Day)
- Hannes Halgryn (Fruitways)
- Dian Craven (Fruitways)
- Tristan Dorfling (Provar)

3. Visits in Central Otago, New Zealand:

13 – 14 January 2025

Host

- Dr Jill Stanley (Jill.Stanley@plantandfood.co.nz), Science Group Leader - Fruit Crops Physiology, The New Zealand Institute for Plant and Food Research.

Programme

- We began the tour on January 13 and 14 with visits to cherry and apricot growers in Central Otago, as well as the Plant and Food stone fruit research trials in Clyde. The growers we visited included Kevin Paulin (Clyde Orchards), Earnscy Weaver (private orchard), Tammy Wilson (Nga Kuri Farm), Nick Common (Lowburn Cherries) and Euan White (Forest Lodge).

Observations

- Clyde Orchards has installed a Cravo retractable roof system (<https://www.cravo.com/>) over one of their cherry blocks and plans to extend coverage to additional blocks. The retractable roof is primarily used for wind and rain protection, but they also use it to manipulate the bloom time. Once the cultivar's chill requirement is met, the system is closed to retain heat and accelerate development. According to Kevin's observations, this results in bloom occurring approximately 3-4 weeks earlier than in uncovered blocks. The system is efficient, with both the side panels and roof over a hectare able to open or close in 2 minutes. However, it comes at a significant cost, with materials alone estimated at around USD 1 million per hectare.



An example of the Cravo retractable roof system at Clyde Orchards.

- With birds posing a threat to the cherries, Clyde Orchards uses autonomous robots that play music or students on 4-wheelers, to help deter the birds.
- Plant and Food Research is evaluating the planar cordon system for use with cherries and apricots. Bi-axial trees from the nursery are planted and then 6 uprights per axis is selected. Jill has observed that selecting buds on the side of the axis for these uprights results in less vigorous growth.
- Establishing a cherry planting with the planar cordon system under a cover is estimated to cost approximately NZD 250 000 per hectare.
- Lowburn Cherries has 65 hectares of cherry orchards trained to both the pergola and parasol systems. Their trees begin cropping in the third leaf and they aim for a full bearing target yield of 20 tons per hectare. Nick noted that they can get their cherries to the market in China within 48 hours of harvest.



The pergola training system at Lowburn Cherries.

- Earnscy Weaver mentioned that they achieved a profit of NZD 300 000 per hectare of cherries in 2024. The average size that season was 32 mm, with larger cherries selling for up to NZD 50 per kilogram. The minimum marketable cherry size was 28 mm.



An example of Earnscy Weaver's cherries approaching harvest time.

- We visited Forest Lodge Orchard, a fully electric farm where six hectares of cherries are marketed under "electric cherries". According to Euan White, this is the world's first 100% electric, zero fossil fuel orchard. Impressively, the farm generates 80% of its own electricity through solar power, which is then used to operate all on-farm systems, tools and vehicles. For more information about Forest Lodge Orchard, visit <https://www.forestlodge.nz/>.



Forest Lodge
Orchard's
Monarch electric
tractor.

4. Visits in Nelson, New Zealand:

16 – 17 January 2025

Host

- Tristram Hoddy (tristram@vailima.co.nz), Grower, Vailima Orchard and Craig Hornblow (craig.hornblow@agfirst.co.nz), Horticultural consultant and Director, AGFIRST Nelson.

Programme

- On Thursday, 16 January, we began the day with a visit to Vailima Orchard (Tristram Hoddy), followed by a visit to Waimea Nurseries (Bruno Simpson). The remainder of the Thursday and the whole of Friday were spent visiting growers in the region, including Hoddys Fruit Company (Kevin Withington), Golden Bay Fruit/Heywood Orchards (Evan Heywood), Fairfield Orchards (Shane Bensemann), Wairepo Holdings (Simon Easton) and Willisbrook Orchards (Rob Holthum).

Observations

Vailima Orchard

- Vailima Orchard cultivates 220 hectares of apples, with 50% under netting. Most of their trees are planted on M.9 rootstocks and their preferred training system is a V-trellis, with a plant spacing of 3.5 x 0.5 m.
- Vailima Orchard grows their own apple nursery trees by planting bench-grafted trees, known as “starts”, in the orchard. Tristram mentioned that they get about 98% take using this method. They do this mainly to save costs – it costs them NZD 6-8 per tree, compared to around NZD 23 for trees from a nursery. The process is:



Year 1

Trees are planted in the orchard that acts as a nursery for a year. Tops are pinched and two leaders are selected.



Year 2

The trellis structure with wires is installed.



Year 3 and 4

Cables are installed across the block, and hail netting is put up. In the 3rd year (2nd leaf), the trees produce their first harvest, yielding between 20 – 25 tons per hectare.



This is an example of a full bearing V-trellis block planted at a density of 3.5 x 1.2 m. For a cultivar like Gala, the target yield on this system is 80 to 85 tons per hectare, with an 85% Class 1 on-tree packout.

- It was interesting to note that they use hydrogen cyanamide to synchronize the bloom, resulting in more uniform fruit maturity at harvest.
- Their thinning practice includes pruning the buds as accurately as possible, followed by manual flower thinning, where a single flower (either king or lateral) is selected from each cluster.
- They primarily use a CaCl formulation for calcium sprays, which could act as an alternative or supplement to CaNO₃, thereby reducing the amount of nitrogen applied.
- They use Budcyt™ (thidiazuron) to promote bud growth on blind wood in young trees. This could be of interest to us, as it is not an oil-based product.
- Vailima topworks select high density orchards where the rootstocks are healthy. This allows them to avoid replant conditions and reduce costs, as there is no need for fumigation, replanting, or other related processes. The tops of the trees are cut off in winter and the new

cultivar is grafted onto the tree. Two to three nurse branches are left on the side opposite to the grafts and the remaining portion of the leader above the grafts is removed in the following winter.



This is an example of a Jazz™ tree grafted to a new cultivar in winter 2024.

Visits with Craig Hornblow – AGFIRST

- *Waimea nurseries* is the largest nursery in New Zealand, with one million apple trees scheduled for delivery this winter. The nursery operates primarily on a grow-to-order basis, with a 10% production buffer. Their policy requires growers to accept and pay for the trees once they have been planted in the nursery. Additionally, 50% of the payment is collected upfront.
- The biggest cultivars currently in the nursery are Rockit™ and Joli™. Currently, the nursery's rootstock orders are split approximately 60-70% M.9 and 30-40% G.202. They're also interested in G.41; however, it has proven difficult to propagate.
- *Hoddys Fruit Company* predominantly trains their trees to a formal palmette 2-dimensional structure, supported by a 7-wire system, with wires spaced 380 mm apart starting at 600 mm from the ground. Trees are planted at a spacing of 3.5 x 1 m and maintained at a height of $\pm$ 3.6 m.



Hoddy Fruit Company's highest-yielding block consistently produces 130 - 150 tons per hectare 7
 - Braeburn on M.793 planted at a spacing of 2.5 x 2 m and trained to the palmette system.
 Kevin noted that the block requires intensive summer pruning and Regalis® treatments.

- Evan from *Golden Bay Fruit* mentioned that the high production cost necessitates growing high-value apple cultivars. Currently, the cost of production is NZD 32-34 per kilogram, which means they must grow cultivars that can generate returns of NZD 40 or more per kilogram to remain profitable. Dazzle™ is currently their highest-earning cultivar, while Sassy™, Posh™, and Envy™ also achieve prices above NZD 40 per kilogram. Evan also noted that European canker poses a greater challenge for *Heywood Orchards* than fire blight. Managing European canker costs approximately NZD 4000 per hectare annually for the required spraying and labour and can result in a 2-5% loss in income per hectare.



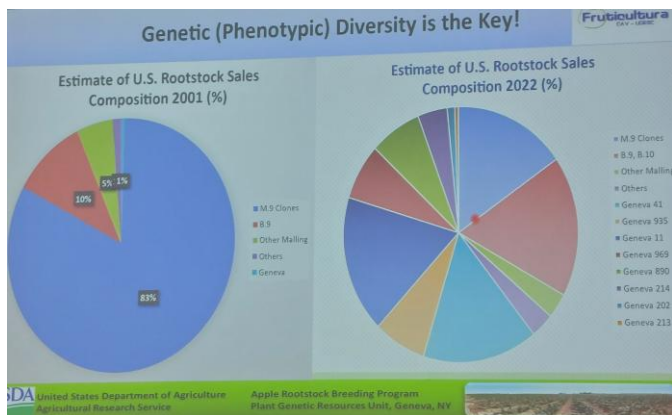
An example of the spraying warning and details on Heywood Orchards. As some of the orchards are located near residential areas, Heywood assigns an employee to video record the tractor and spray drift when spraying near houses to protect them against accusations of improper spray application.



An example of a single drape net covering two rows of two-dimensional trees at *Fairfield Orchards*.

General Observations

- Our visits to Plant and Food Research and growers made it clear that we're more closely aligned with growers' needs than Plant and Food Research. Because they're primarily state-funded, all their research isn't always driven by industry priorities. In contrast, our industry funding ensures that our focus directly aligns with our growers' needs.
- Dry matter content is increasingly used as a quality indicator to differentiate orchards for specific markets. It serves as an indicator of taste and storability. Norms for relevant cultivars have been developed to guide the assessment.
- Based on discussions with Craig Hornblow, the growers we visited and Waimea nurseries, there is a growing interest among growers in exploring alternative dwarfing rootstocks to M.9 that offer resistance to fire blight, European canker, and woolly apple aphid.



The trend of exploring alternative rootstocks to M.9 is also evident in the USA.

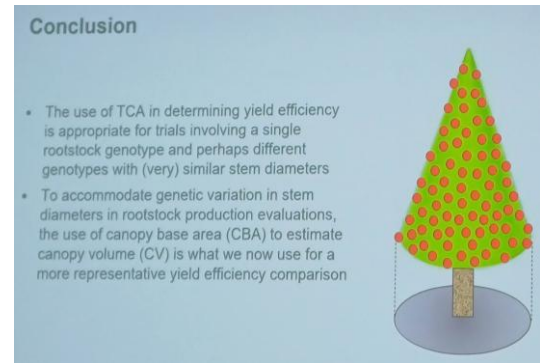
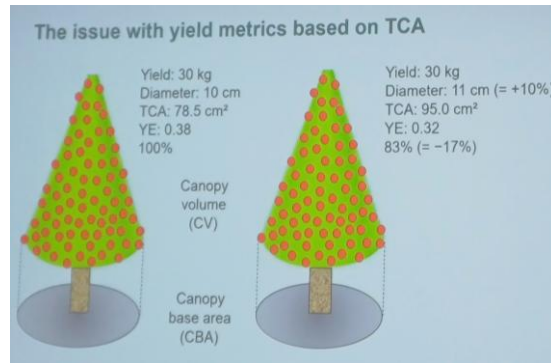
- The New Zealand growers we met pay little attention to cover crops due to the favourable soil conditions, the associated costs, and the climate. Their principle is that anything not directly contributing to the value of the fruit is not a priority.

5. XIII Orchard Systems Symposium, Napier, NZ:

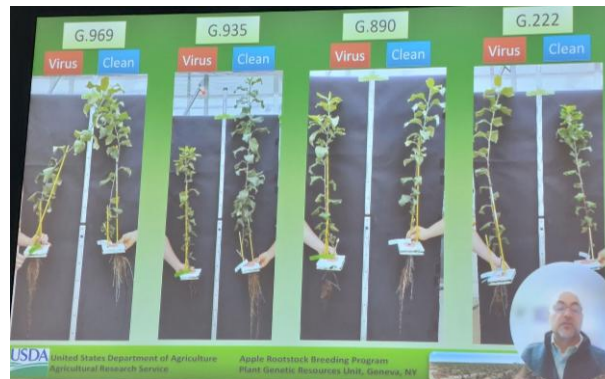
19 – 24 January 2025

Event	XIII Orchard Systems Symposium
Convenors	Dr. Adam Friend and Dr. Ben van Hooijdonk
RSA participants	Wiehann Steyn, Willie Kotze, Graeme Krige, Pierre du Plooy, Andrew van Lingen, Marno van der Westhuizen, Dian Craven, Hannes Halgryn, Tristan Dorfling, Frederik Voigt (ZZ2) and Gustav Lotze (US).
Programme	The symposium spanned 4 days and featured presentations on the following themes: breeding, environmental physiology, orchard management, digital horticulture, modelling, rootstocks, training systems and fruit quality. On Thursday, 23 January, we had a field tour to Rockit Apple, T&G Global and Camelot Orchards.
Noteworthy and interesting presentations	• How changes in the orchard microenvironment can affect fruit growth physiology: a case study on the use of multifunctional covers for sweet cherry – Dr Brunella Murandi • Using the photosynthetic active radiation intercepted and crop load to compare fruit tree yield performance - Prof. Gabino Reginato • Phenotyping sunburn susceptibility in apples – Assoc. Prof. Lee Kalcsits • Drought emergency plan: apple tree behavior to a single megadrought season – Dr. Joan Girona • Drought emergency plan: managing apple tree orchards during extreme droughts – Dr. Victor Blanco • Regulating crop load of 'Celina'/QTee® pear – Mr. Jef Vercammen • Evaluation of alternative chemical rest-breaking agents in 'Rosy Glow' and 'Fuji' apple trees in South Africa – Mr. Dian Craven • New metrics for productivity evaluations of new apple rootstocks – Dr. Vincent Bus • Influence of early-season deployment of reflective material on 'WA 38' fruit retention and crop performance – Dr. Sara Serra • Effects of leaf pneumatic defoliation and reflective mulch on canopy features and fruit quality of Rosy Glow' apple – Dr. Alessio Scalisi • Revisiting aminoethoxyvinylglycine as an apple branching agent – Assist. Prof. Thomas Kon • New apple training systems, more density with fewer trees - Dr. Jaume Lordan Sanahuja • Comparison of different planting material, rootstocks, and tree training systems for 'Gala' apple – Dr. Christiaan Andergassen • Using aeroponic systems to study apple rootstock: from genomics to metabolomics without shovelomics – Prof. Gennaro Fazio • Development of the narrow-row planar cordon sweet cherry growing system: from concept to commercial success – Dr. Jill Stanley • Rapid growth of apple fruit leads to xylem dysfunction and bitter pit in 'Honeycrisp' – Mr. Chayce Griffith • Self-ventilating rain cover effects on orchard microclimate and sweet cherry fruit quality – Dr. Dugald Close • Assessment of novel apple rootstocks representing three vigour classes for South Africa's apple industry – Mr. Tristan Dorfling • Are intensive orchard systems sustainable in today's socio-economic climate? - Prof. Dr. Ted M. DeJong • Advancing quality in deciduous nursery trees: management and propagation innovations – Mr. Frederik Voigt
Some learnings	• The impact of shade nets on fruit development may vary depending on the fruit type. It also depends on the latitude, the irradiation level and temperature. – Prof Brunella Morandi presented on this topic at the June Crop Production Forum and expressed interest in collaborating with Dr. Dzikiti, to replicate her study on plums and pears.

- Yield efficiency in different rootstocks is currently assessed using trunk cross-sectional area (TCA). However, the correlation between TCA and aboveground biomass production appears inconsistent when comparing rootstocks from different breeding programmes. Alternative productivity metrics were proposed, such as using kg fruit produced per canopy base area or per photosynthetically active radiation intercepted. – **The issue was listed as a research gap in the 2025 gap analysis.**



- Prof. Gennaro Fazio illustrated the severe effect viruses can have on sensitive rootstocks. – **W Steyn and M van der Westhuizen will be visiting his lab in June and will be discussing the topic further.**



- As part of the symposium's orchard tour, we visited a Rockit™ orchard on M.9 trained to a planar cordon system, which produced 70 tons per hectare in its fifth leaf. Significant blind wood was observed on the trees and was ascribed to bud extinction. Apparently, this is an attribute of Rockit™.



An example of the blind wood on 5th leaf Rockit™ trees on M.9 rootstock.

- Several presentations focused on apple training systems, comparing single leader systems like slender spindle and palmette with multi-leader systems like bi-axis and planar cordon. A common theme across the talks was that transitioning to a simpler, two-dimensional canopy can significantly enhance orchard efficiency and fruit quality. It was also clear that interest in these canopies is growing worldwide. However, the need for long-term studies to better understand their performance and sustainability over time was noted. – **Dr. Christiaan Andergassen indicated that he would be keen to present on this topic at the 2026 Hortgro Technical Symposium.**

6. Appendix 1: Contacts

1. **Dr. Jill Stanley** - jill.Stanley@plantandfood.co.nz (Science Group Leader - Fruit Crops Physiology, The New Zealand Institute for Plant and Food Research)
2. **Tristram Hoddy** - tristram@vailima.co.nz (Grower, Vailima Orchard)
3. **Craig Hornblow** - craig.hornblow@agfirst.co.nz (Horticultural consultant and Director, AGFIRST Nelson)

7. Appendix 2: Itinerary

ITINERARY FOR TRIP TO NEW ZEALAND

<u>13 JAN:</u>	The New Zealand Institute for Plant and Food Research Plant and Food Research, Clyde.
<u>14 JAN:</u>	The New Zealand Institute for Plant and Food Research Plant and Food Research, Clyde.
<u>15 JAN:</u>	Travel to Nelson.
<u>16 JAN:</u>	am. Visit Tristram Hoddy – Vailima Orchards, Nelson. pm. Grower visits with Craig Hornblow, Nelson.
<u>17 JAN:</u>	Grower visits with Craig Hornblow, Nelson.
<u>19 – 24 JAN:</u>	XIII Orchard Systems Symposium, Napier.
<u>25 JAN:</u>	Return to Cape Town.