NZGROWER®

VOL 77 | NO 03 | APRIL 2022

HORTICULTURE NEW ZEALAND

EGGPLANT BALANCING ACT

PAGE 22

IN THIS ISSUE

Thinking vegetable seeds? Think **Terranova.**

Early Hybrid Onion

Pendaves

- Early maturing hybrid onion.
- Large globe shaped bulbs with high yield potential.
- Very strong seedling vigour with high establishment rates.
- Good skin quality and retention.
- Medium firm bulbs.
- Good management for downy mildew required.

KiwiGold

- Quality export onion, ideal for European markets.
- Long storage onion with excellent shipping potential.
- Uniform globe shape bulbs with good size uniformity, firm with very good skin quality.
- Excellent pack-outs.
- Reliable performer over many years.

ELK Onions

Terranova M&R Early

- Improved vigour and uniformity of bulb shape.
- Globe shaped bulbs with strong brown colour.
- Excellent storage.

Applause

- Vigorous ELK type with strong plant growth.
- Uniform in size and shape with the majority in “Medium” size grade 70-90mm.
- Very firm bulbs with excellent skin retention and storage potential.
- Strong against bolting.
- Maturity approximately 10 days later than KiwiGold.

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Cover image; Trefor Ward.

WHAT'S NEW

A regular advertorial section of new products and services. This publication does not endorse the products or services featured here.

AT LAST THERE ARE POSITIVES TO CELEBRATE

Barry O'Neil : HortNZ president

I suggested the government had asked us to swallow a RAT last month. I should have been more careful about what I said because, as I write this, beside me is my positive RAT test!

That said, some real positives have happened over the last little while. Recognised Seasonal Employer (RSE) scheme worker numbers increasing to 16,000 is good, even though we would have liked this number to be 25,000, but at least it's a start. And with Working Holiday Visas starting again in mid-March, we will hopefully begin to see a return of backpackers to the country, to address the 10,000 shortfall in seasonal workers. And good to see Managed Isolation and Quarantine (MIQ) being phased out, along with bringing forward the border opening dates for tourism to start to recover.

And very good to see the changes the government has made to critical workers being able to continue to work, and for isolation periods to be reduced to seven days. It's absolutely essential that we allow our healthy workers to work!

I really commend the industry for its collaborative approach to the labour shortage, and the willingness to work as the horticulture sector to support each other. It's a no brainer to me, and something we should continue to focus on in the future, rather than competing with each other internally.

Another area for collaboration is how we go about attracting backpackers here, and making the campaign so appealing that they come to this side of the ditch. There's a great opportunity to work together to make this happen.

Harvest is beginning for our two biggest sectors, apples and kiwifruit, which is always something to celebrate. After a year of hard work to get the crop to its best possible state, there's nothing like picking and seeing the truck leave the orchard taking the fruit to market. The fruit is looking fantastic this season and while we all have our fingers and toes crossed that we can get it all picked, packed and shipped, we are off to a great start.

> **"With Working Holiday Visas starting again in mid-March, we will hopefully begin to see a return of backpackers to the country, to address the 10,000 shortfall in seasonal workers**

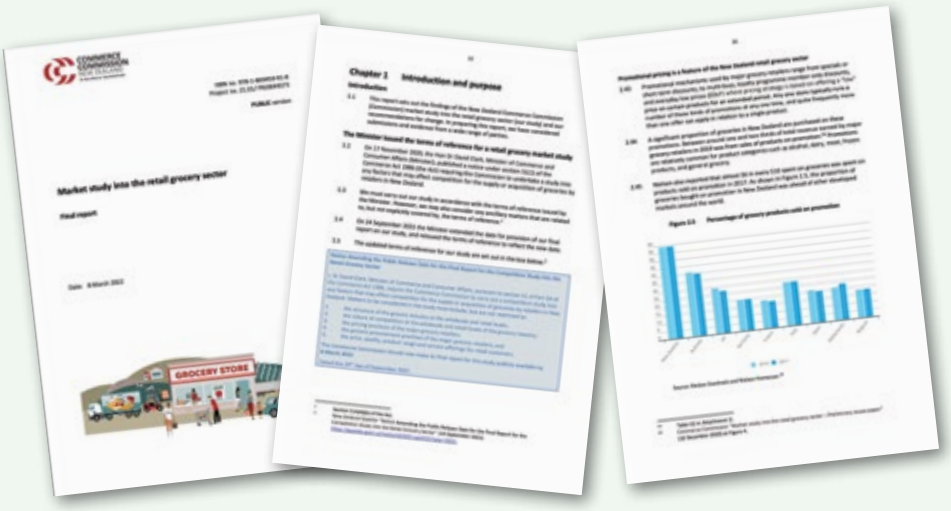
I really appreciate the efforts being made by many people to look after each other and our 'wellbeing.' There are some really great initiatives.

I encourage everyone to make time to have a cuppa and catch up with others, which is a great way to keep an eye on each other.

> **"And very important that we get our consumers supporting fantastic New Zealand-grown produce – this will ensure sustainable production into the future, which is at risk if cheaper, lesser quality produce floods our markets**

Country of Origin labelling has been a long time coming but it has arrived, with the regulations coming into effect and now, imported produce needs to be labelled as such. I congratulate all the people over the years that have been working hard for this outcome, even though there was some serious push-back from others in the primary sector, along with the government.

With our compliance costs increasing as a result of labour, fuel, audits, the Emissions Trading Scheme (ETS) and so on, it's important that our consumers are not duped into buying cheaper imported produce that doesn't have the same production standards and costs.



And very important that we get our consumers supporting fantastic New Zealand-grown produce. This will ensure sustainable production into the future, which is at risk if cheaper, lesser quality produce floods our markets.

The Commerce Commission's report into the supermarket duopoly is another welcome outcome. While the devil will always be in the detail, it does address some of the challenges fresh produce growers have been having. The supplier retail code of conduct is what HortNZ called for and will be a real help, if it is similar to what already exists in Australia and the United Kingdom to protect growers. Also helpful will be the recommendation to establish both a grocery sector regulator and a dispute resolution scheme.

The New Zealand-United Kingdom Free Trade Agreement (FTA) is another very welcome positive, having now been finalised and signed. The up to 8 percent tariff that applied to some horticulture products is being removed. Let's hope this outcome gives the European Union FTA negotiators a rev up to finalise what will be one of the last FTAs that New Zealand will probably enter into, as most other parts of the world are already covered with good trade agreements.

Wonderful also that the police got rid of that rabble in Wellington. They must need the patience of a saint to be in that job.

While I am fully on board with peaceful protests, what I saw in Wellington was a small group of hooligans that to me, have no place in our society.

> **"With our compliance costs increasing as a result of labour, fuel, audits, the Emissions Trading Scheme (ETS) and so on, it's important that our consumers are not duped into buying cheaper imported produce that doesn't have the same production standards and costs**

Lastly and another positive at least for me, my Covid-19 infection was mild, thanks to what I think is our impressive vaccination rates and great community health support system. It is always a bit of a worry not knowing how your body will react to the virus so in some ways it's a relief to have had it.

I hope if you get Covid-19, it's mild also, and that the peak happens quickly so we can get back to a sense of normality.

Kia kaha. ●

NZGROWER

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Your Levy AT WORK

MPA Associate Member (NZ)

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WORKING TOGETHER FOR THE GREATER GOOD

Nadine Tunley : HortNZ chief executive

If all of Horticulture New Zealand's members were a part of one massive business entity, our diversity would be a considerable strength.

But as we are not one business entity, it is often a considerable weakness. HortNZ's role is to bring our industry together for the greater good. When we say this, it is because the unity of our collective voices has a greater impact and influence. This is particularly important when we are lobbying the Government for policy settings that will 'create an enduring environment where growers thrive'. That is HortNZ's purpose.

Early in the export fruit season, HortNZ brought together the relevant summerfruit, apple and kiwifruit product groups, along with New Zealand Winegrowers, Zespri and T&G Global to discuss and agree on a coordinated communications approach for the season. The group has focused on the kind of story it wanted to broadcast about the coming season. With that clear, the group has worked together to tell as positive a story as possible about the challenges and how the industry is responding, while making it clear that the situation is tough and unsustainable.

Early in the new year, it was apparent that we were facing some of the worst labour shortages known to our industry. It was also clear that the shortage would be compounded by Omicron – and that is exactly what has happened. There was also the necessity for this communications 'team' to distil and disseminate to growers, as quickly as possible, the significant volume of information coming out of the Government about Omicron. We did this to try and reduce the pressure and additional workload on growers to wade through such a lot of sometimes contradictory information.

Constant discussion

Throughout the year, we speak constantly with the Government about what our industry needs in terms of policy settings. This is so that growers can thrive, and New Zealand and the world can enjoy fresh, healthy and nutritious fruit and vegetables, particularly at a time when the world's health and wellbeing is under immense pressure.

This is a relentless job. While as an industry we might live and breathe growing, central government officials in Wellington do not and neither do most regionally based local government officials. Overlay this situation with the fact that churn and change in central government are high, and you have quite a task.

That is why it is important the horticulture industry speaks with one coordinated voice in a considered and consistent way, so the message gets through. If we don't or if we can't, we create an environment where government officials become confused and decide what they *think* is best for our industry, based on what they have heard, which is often wide of the mark.

As an industry, we also need to remember this is a majority government that can make changes as it wants. We can't just toss our toys in this environment, otherwise, we will lose our seat at the table and risk not getting it back.

What we must do is speak with a united, coordinated and cohesive voice, that is backed up by robust analytics, solid data and policy that creates a compelling case. As HortNZ chief executive, that is my goal and I want to build on the success we've experienced with the export fruit groups and wine.

Increasing production costs

The increasing costs of production are affecting all of our members. This has been particularly topical for our vegetable sector of late, reducing already slim margins and putting vegetable growers under immense pressure. Over April, we will work with vegetable product groups and industry representatives, to put a coordinated advocacy plan in place, focused on the most significant issues. In doing so, we will provide the Government with a clear picture of what the New Zealand vegetable industry needs, in order to be sustainable and profitable. This will require collaboration and cooperation – but as outlined in this column – it has worked well for the export fruit groups.

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NATURAL RESOURCES AND ENVIRONMENT

Michelle Sands : HortNZ environment manager

Selwyn District Plan – hearing

Selwyn District Council notified the proposed Selwyn District Plan for public consultation in October 2020. Submissions on the proposed plan closed on 11 December 2020.

Key matters that are managed by the district plan include:

- Land zoning and subdivision – managing how land use change can occur and where urban growth is located.
- Reverse sensitivity issues for managing conflict between land uses, including things like noise, light, standards for sensitive activities.
- Provisions for buildings and structures, such as glasshouses, packhouses, worker accommodation and crop protection structures.
- Storage and management of hazardous substances.
- Protection of special features, landscapes and sites of significance.

HortNZ and its expert planner presented evidence at the rural zone hearing in March.

Waikato District Plan – appeal

The decision version of the Waikato District Plan was notified on 17 January 2022, appeals closed 1 March 2022. Parties may join appeals as 'Section 274' parties by 22 March 2022. A total of 67 appeals were lodged.

HortNZ's appeal relates to:

- Opposing requirements for Seasonal Worker Accommodation being limited to a Record of Title with an area of at least 20 ha (otherwise non-complying).
- Opposing 12m setback requirement for artificial crop protection structures.
- An amendment to GRUZ-P5 to 'provide for' (i.e., through case-by-case assessment of appropriateness) rather than 'enable' non-rural activities.
- Seeking deletion of GRUZ-P16.
- Seeking to enable 'Ancillary Rural Earthworks' in flood management overlays.
- Seeking an amendment to the definition of 'farming' that restricts loading areas for helicopters and airstrips to only activities on the 'same site'.

Hawke's Bay Outstanding Water Bodies – mediation

Hawke's Bay Regional Council Plan Change 7: Outstanding Water Bodies proposes to change the Regional Resource Management Plan (RRMP) to include a list of the region's outstanding water bodies, together with a framework which prescribes a high level of protection for these water bodies in future plan making.

The water bodies identified in the proposed Plan Change 7 are the 'best of the best' within the region, featuring exceptional cultural, spiritual, recreation, natural character, landscape, geology or ecology values which are remarkable in Hawke's Bay.

The decision on the Plan Change was appealed, by parties wanting to add more water bodies and more criteria. HortNZ has joined the appeal as a 274 party and is participating in the mediation.

The focus of HortNZ's involvement in the mediation is to help make the plan provisions clear and easy to understand for future plan users. We want to ensure that the identification of outstanding water bodies and their significant values is related to the purpose of the National Policy Statement, and that only those water bodies that are truly outstanding are captured by the plan change.

Auckland Council – collaborative science project

HortNZ has committed to a joint modelling project with Auckland Council. Where possible, we seek to work with regulators to develop a mutual understanding of the science and economic information that will underpin future regulation.

The aim of the project is to improve the way vegetable growing is represented in the Auckland Council Freshwater Management Tool. The project aims to improve the representation of vegetable rotations, management practices and the economics of the vegetable growing.

Two growers are on the Technical Advisory Group. The groups also include a representative from Plant & Food Research, Agribusiness Group and HortNZ. The project will draw on previous modelling and the work underway as part of the Sustainable Vegetable Systems research project.

A growers' reference group has been established. Workshops will be held to ensure that a range of growers have input into the way vegetable growing is represented in the Freshwater Management Tool.

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PARTICIPANTS EMPOWERED BY LEADERSHIP PROGRAMME

Kristine Walsh

Sarah Cobbold, Canterbury GoHort career progression manager

Participants in a pilot course designed to support emerging leaders in the horticulture industry say it has boosted their confidence, as well as their skill base.

Based in the Nelson region, the 23-strong pilot group for the Emerging Leaders Programme was a mix of supervisors, quality controllers, packhouse managers, foremen, research technicians and coolstore managers of varying ages and years of experience.

Of those, 22 completed the programme. Participants reported measurable improvement to their confidence, along with their ability to deal with conflict and "to have the hard conversations" that can arise in a workplace.

Emerge And Transform founder and coach, Sha Perera, initially developed the programme for the dairy sector and tweaked it for horticulture with the input of NZ Apples and Pears capability and development manager, Erin Simpson and GoHort's former team leader, Emma Boase. The trial for the three-month programme began in July 2021.

Sha says that, like others within the primary sector, the horticulture industry is facing big challenges due to labour shortages and it is vital that those working in leadership roles are empowered to work through the resulting changes.

"Emotions underpin all the decisions we make and are the number one driver of human behaviour," she says. "As such, the Emerging Leaders Programme centres on using emotional intelligence to help deal with challenges both in and out of work."

The programme is delivered using bite-sized, app-based learning modules and peer-to-peer workshops for learning and discussion which focus on creating "shifts" in mindset, relationships, perspective, focus, skillset and confidence.

"[It has helped me] to trust myself more and learn different ways of handling situations so I can make my team grow too," said one participant. Another said it had given them the "skills to stop managing and start leading".

Participants liked the way the course was delivered, too – with individual modules being knocked off in just five to ten minutes a day.

> **"The horticulture industry is facing big challenges due to labour shortages and it is vital that those working in leadership roles are empowered to work through the resulting change**

Canterbury GoHort career progression manager, Sarah Cobbold, says she and her colleagues across the regions are now reaching out to growers and orchardists to see who would get most benefit from the next delivery of the programme.

"The programme addresses the gap that existed for upskilling emerging leaders at a grass roots level, who would flourish with further training," says Sarah. "It creates a win-win for employers and employees and serves to retain staff and grow people in the industry."

PREVENTING INJURIES IN THE HORTICULTURE INDUSTRY

Emily Lake : HortNZ data, systems and insights manager

HortNZ has received funding from the ACC (Accident Compensation Corporation) for a project to look at how we can decrease injuries and deaths in the industry through tools that reflect what happens out in the orchard and vegetable garden.

The first step is to understand the real-life, on the ground picture around how and why injuries and deaths occur. Through this fuller picture, we can begin creating practical tools with industry, for the industry.

If you want more information or are keen to participate in our initial data collection, please contact me: **emily.lake@hortnz.co.nz** or **027 582 6655**.
All data collected will be anonymised and used within strict privacy guidelines.

Speaking from experience

Catherine Lewis, a director at Lewis Farms, says she is interested in the project as she has noticed a higher rate of minor physical issues with people this year.

"We've had what seems like a greater number of people in our packhouse this year with sore backs and stiffness, due to both the age of our workforce and repetitive nature of the work. So, I am keen to look at ways to get on top of this issue so that our employees are fit, comfortable at work, and productive."

Kate Trufitt, New Zealand Horticulture Health and Safety Council chair, says safety interventions can target the human, or the technological and organisational environment.

"But without understanding the harm first, it is difficult to know what interventions to develop. Safety is measured mainly by the absence of negatives, but this is changing. Safety professionals are now looking at harnessing people as the solution rather than the problem. So rather than use procedures, compliance and sanctions, we want to build the capacities of our people and in turn, industry.

"I really look forward to the outcomes of this project. That is, sustainable inventions to reduce harm in horticulture."

More about the project

The project will build capability and establish health and safety leadership through four key project steps:

Understand → Intervene → Support → Lead

An essential component of this research is engagement with the sector. It will ensure any harm reduction efforts are developed based on the sector's knowledge and successes, and reflect how business works within horticulture in New Zealand.

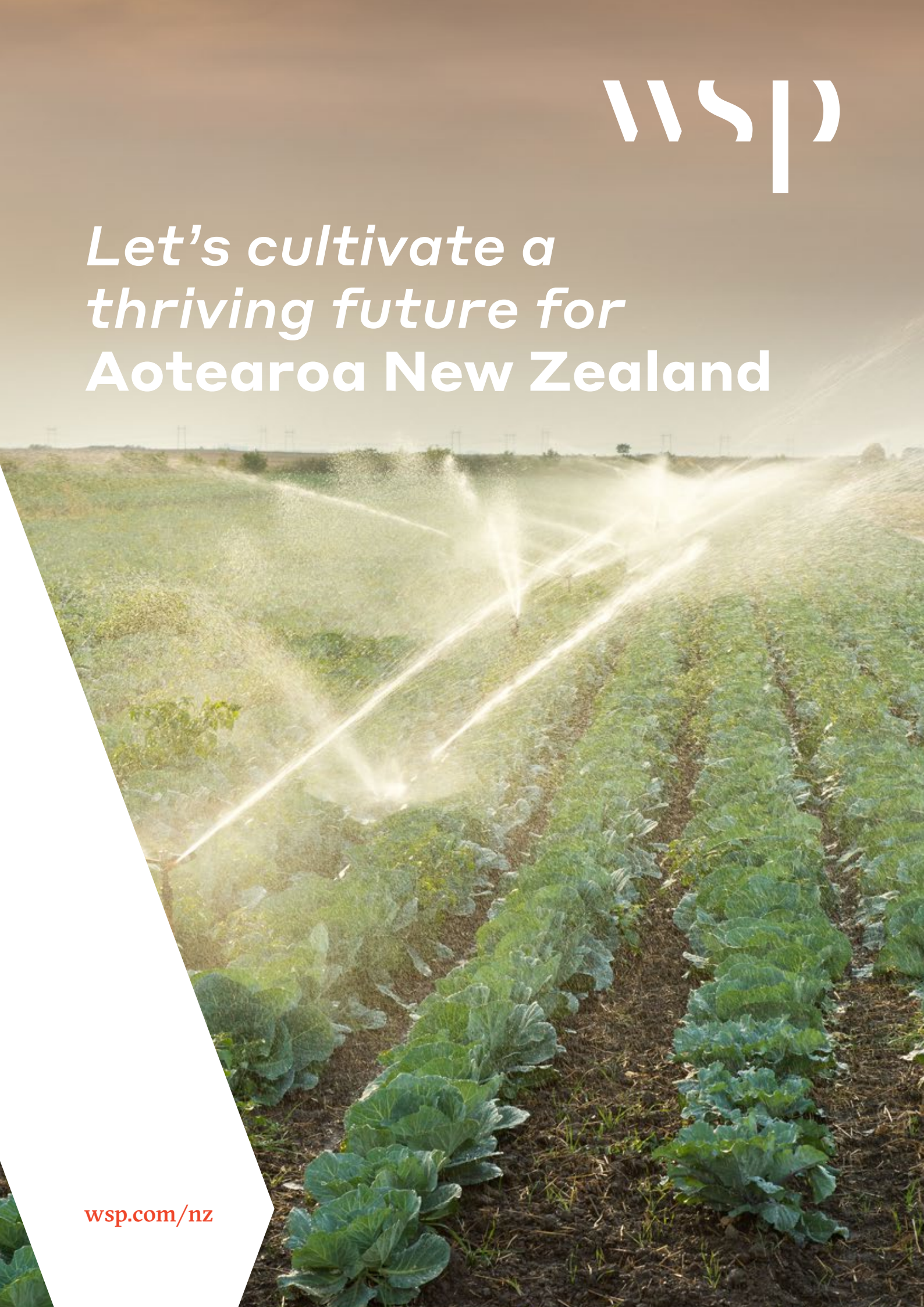
A systems thinking approach will be used, which simply put, will focus on company arrangements, work pressures, procedures and regulations, in addition to what individual workers are doing.

> "A systems thinking approach will be used, which simply put, will focus on company arrangements, work pressures, procedures and regulations, in addition to what individual workers are doing

While HortNZ is leading this project, collaboration across the horticulture industry is key to ensuring success. The project is designed to begin with evidence and information sharing. Ultimately, activities will have the industry leading their own best practice initiatives with new tools and resources that are practical to implement and effective.

In terms of Step One – Understand, we need to understand the real-life, on the ground picture around how and why harm occurs. We need to understand how things are done in the sector, how people collect information about harm, and what people see as critical issues. By gaining this fuller picture, we can begin creating practical tools with industry, for the industry.

Let's cultivate a thriving future for **Aotearoa New Zealand**



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YOUR INDUSTRY

ACROSS THE SECTOR – ACROSS THE COUNTRY

GELLERT NURSERIES EXPANDS IN CHALLENGING TIMES

Geoff Lewis

Photography; Trefor Ward

Horticultural propagators are an essential first step in the highly productive glasshouse and covered growing industry and are impacted by labour, Covid-related import challenges and, critically for indoor horticulture, energy supplies.

Gellert Nurseries at Karaka was established in 1988 on 6ha of what was the family dairy farm in the 'dark days' of growing in soil. Director Steve Gellert and wife Gillian bought the operation from his parents. At one time out in the country, it now faces burgeoning urban development just over the fence.

Gellert Nurseries is one of the two largest growers of seedling plants in the New Zealand horticultural industry. A little over half the business is providing millions of tomato, capsicum, aubergine and, until recently, cucumber seedlings in dozens of varieties, to other glasshouses and covered growing operations nationwide. Included in the output are new varieties of kiwifruit in contract trials for Zespri and Plant and Food Research. Gellert Nurseries is also a massive supplier of popular indoor pot plants and orchids, all for the domestic market.

The covered crop vegetable industry underwent massive growth in the 1990s but has been pretty static since, Steve says. But what has gone ahead in a big way has been interest in leafy greens, strawberries, blueberries and protected kiwifruit.

The site currently has 3.2ha under glass and is almost full. Steve has one new 8200 sqm glasshouse to go, with builders planned on-site in March. Around $3 million worth, it is currently lying on site wrapped in its import packaging.

"I have a whole brand-new greenhouse in bits. Our current glasshouses are manually operated systems, but the new glasshouse will be computer-controlled and fully automated with 900 x 4.5/2m (seedling) tables moved by two robots. All the grower must know is how to input information."

This will reclaim space for Gellert's vegetables operation, which is all on precision-built concrete 'ebb and flood' floors.

Cucumber production has been hit by a disease, which is thought to be an agrobacterium which creates 'beaded roots' and stunts the growth of the plant.

"No one has been able to figure out what it is so far. It was a tough decision to go out of cucumbers. We announced it to the industry last year and we're still trying to find a solution.

> "Gellert Nurseries is one of the two largest growers of seedling plants in the New Zealand horticultural industry

In propagation, the aim is to provide a consistent high-quality product at a competitive price, on time, all year. There are two major players nationally, Gellert and Zealandia, and it is a very competitive industry, Steve says.

At Karaka, the seedling plants are grown in a rockwool substrate which acts as a medium and conduit for water and nutrients. Gellert is an agent for the Cultilene brand of substrate. But the trade has been impacted by Covid-19 delays.

"We would normally bring in 120 containers (of substrate) from Europe. Growers use slabs in greenhouses. But due to shipping disruptions, importation has turned to custard."

Steve Gellert, director

In the nursery

"What used to take six weeks from Holland, can take six months with the product stuck in Malaysia or Singapore for months. The cost of rockwool slabs has gone up by about 1.5 times. Forty-foot containers that used to be $5000 to $6000 are now about $16,000."

Essential convergent factors in undercover growing include labour, light, heat and CO_2. As Steve explains, by Northern Hemisphere standards, New Zealand has very harsh light with high ultraviolet (UV) levels.

"There are limiting factors. In summertime it's the amount of light we get and the severity of the sunlight. We have screens and we put chalk coatings on the greenhouse, one in September and the second before Christmas as light protection. We remove it before winter."

Once built, Gellert's new glasshouse will use 'diffuse glass' which spreads the light in all directions, and a double anti-reflective coating which pulls light in. Along with natural light, the nursery uses HPS (high pressure sodium) lamps and is considering LED (light-emitting diode) lighting going forward to help reduce power demand and as the science behind the use of LED lighting develops.

"We use grow-lights to guarantee quality of production for the customer, but HPS lights require big infrastructure in transformers, cables, switchboards along with the fittings and lamps.

"I can see in the next five years it will become economical to move to LED lighting. The technology is getting smarter. The knowledge around the use of the light spectrum is also developing which will allow the creation of specific light recipes for different plants."

Grow-lights are used in two ways – to guarantee a minimum light level on overcast days, and to give a certain number of hours of light as daylight hours get shorter during the winter months.

"We have PAR (photosynthetically active radiation) sensors fitted around the nursery, so we know what light we have. Light is essential to plants. There is a lot of research going on around the levels of light you need with different crops, different shades of light, white, red, blue, it's a recipe, the technology is getting better all the time."

When it comes to greenhouse heating, Gellert uses natural gas which has become subject to market supply and price challenges.

"The price of gas is insane. For years we took it for granted. My gas contract is due to run out in February 2023. About 18 months ago I went to the market and asked for prices. There are four major gas suppliers. All declined to supply. In the end one company came back to me and agreed to supply at a 50 percent cost increase. The two biggest growers in New Zealand are purchasing gas month by month at this moment."

Gellert's Karaka site has 35 growing 'compartments' under glass which range in temperature between 15 degrees and 28 degrees depending on the requirement of the plants.

"We must have heat. In its first term the government decided to stop future offshore (oil and gas) exploration and the development of new supply. There was no consultation with industry. They took away our gas supply overnight with nothing to replace it. Now we're importing coal from Indonesia. You can't just turn the tap off if you have no alternative."

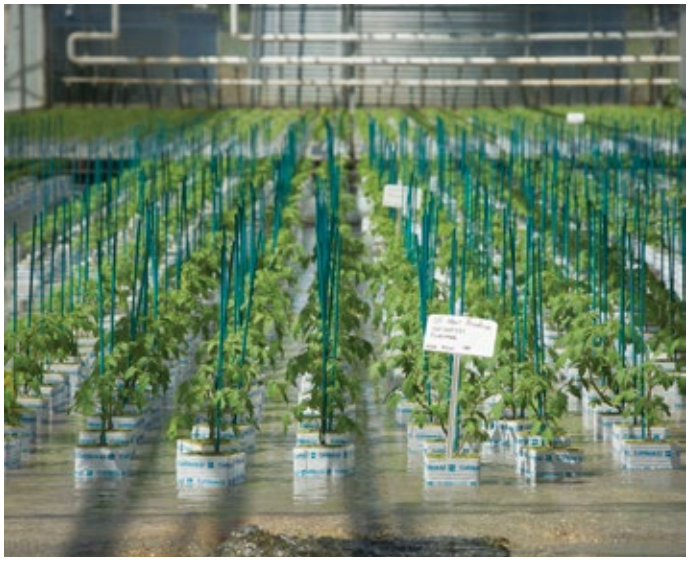
For irrigation and other water needs, Gellert collects rainwater from 3.2 ha of roof area and has 11 million litres of water storage capacity. This provides between 90 and 95 percent of annual water requirements. Bores can also be brought into use in particularly dry summers.

"We recycle 100 percent of what we use, except what is used to back-wash our filter system. Our water is UV sterilised and we are about to install a couple of ultra-filtration units."

The nursery business employs about 50 people year-round and hasn't had the major labour problems faced by businesses with more seasonal requirements.

"Most large horticultural companies are advertising for labour. One of our biggest customers has delayed planting by six weeks, and another has taken 2.5ha of greenhouse out of production because they can't find labour.

"Our strategy is to bring specialist staff into the business. Now we are trying to find a head grower for our vegetable production.



Thriving seedlings

"What we do in propagation is done all around the world, so we're looking for a person who can own the position. We got one specialist in from Australia during the last Covid-19 (travel) bubble. We don't need general labour. We need people who can understand the science and plant physiology. People who want to make a career out of growing."

ASHA'S CAREER – INSECTS WON OUT OVER BIRDS

WOMEN IN HORTICULTURE

Elaine Fisher

Photos supplied by Plant & Food Research

Asha Chhagan, Plant & Food Research entomologist, is researching the guava moth

Asha Chhagan was so intrigued by biology that when it came to deciding what to specialise in for her master's degree, she couldn't decide between birds or insects.

"I was at a fork in the road and could have gone either way. What took me to entomology was when I visited HortResearch (now Plant & Food Research) to meet with a potential supervisor and entomologist Philippa Stevens. She was so passionate about her work that it steered me to entomology," says Asha who is now a Plant & Food Research entomologist, based at Mount Albert in Auckland and a member of Women in Horticulture.

> "Although very much "a city kid," Asha says growing food is in her genes

Asha is researching the sustainable management, biology and distribution of guava moth which has been in New Zealand for more than 20 years and thrives in the warm Northland climate.

Although very much "a city kid," Asha says growing food is in her genes. "My parents owned a fruit shop in central Auckland and from a young age I was exposed to lots of exotic fruit and vegetables."

Among her happy childhood memories is visiting the Turners & Growers auction rooms near the waterfront with her dad early in the morning to pick up fruit and vegetables for the store.

"My extended family were market gardeners at Pukekohe, growing potatoes, onions and greens and my relatives in India were market gardeners too, so I guess horticulture is in my blood."

Asha credits her understanding of the horticultural industry through all stages from growing, to retail to the consumer to her childhood experiences and family traditions. It's that background which also motivates her to carry out research to make positive differences for growers.

An adult female guava moth on a loquat fruit

Male guava moths caught in a pheromone trap at Plant & Food Research's Mount Albert orchard

Her first introduction to that kind of research was working part-time at HortResearch while studying for her master's project. "Once I graduated, I was lucky enough to be offered a job as a technician which led to opportunities to move through the ranks to researcher and most recently, scientist."

Despite its name, the guava moth (*Coscinoptycha improbana*) doesn't affect only guava fruit. "It has a large host range including feijoa, macadamia, citrus, loquat and plums so is a problem not just for commercial growers but the home gardener too.

"I've been working on this project for three years and the moth is one of the most challenging of pests when it comes to understanding its life cycle and biology. It doesn't appear to have a diapause stage (a period of suspended development) but develops throughout the year, using different hosts."

The female lays its eggs on the surface of fruit and within 24 hours of hatching, the larvae burrow inside and start eating. Once mature, they crawl out, drop to the ground on silken threads, and make a cocoon out of soil and debris. Adult moths emerge, find each other using pheromones, and mate. The whole cycle takes around eight weeks in summer.

As the moth is only a pest in New Zealand, the research of Asha and her team is world-leading. Guava moth is native to Australia, quite a different biological and climatic environment. Currently in New Zealand the insect is found in Northland, Auckland, the Coromandel and north Waikato but with climate change Asha believes it will move further south.

Management options include pheromone traps for males, mating disruption, insecticides and good orchard hygiene practices including removing fallen fruit and debris from around trees.

While male pheromone traps are an effective tool for monitoring the pest, the ideal solution would be to disrupt mating or create effective traps to capture females.

"If we could find attractants for females it would be a big deal because we could shut down the lifecycle and stop eggs being laid and subsequent larval damage in fruit.

"Work to collect volatile smells from feijoa and test these attractants in the lab produced some positive results. Unfortunately when we took the experimental attractants into the field we did not catch as many females as we hoped."

Funding for the research is coming to an end but Asha hopes more can be found. "Now we have got this far, we don't want to let the research end."

Asha is a strong advocate for young women considering science as a career. "What I especially love is that my work is really diverse and no day is the same. Science offers so many amazing opportunities for women. I really recommend it, in whatever field, as a career choice."

To keep up-to-date with Women in Horticulture, its news and activities, and join the membership database, email **info@women-in-hort.nz** Everyone is welcome.

TOMATO GROWERS ARE SEEING RED

Pamela Niskanen : Find-a-Pest

Over the summer I gorged myself on perfect Campari tomatoes, grown in New Zealand and delivered to my supermarket richly red, perfectly sized and still bound to fragrant trusses. I think it has been the best tomato season in recent memory. But behind the scenes, there's a whole lot of hurt going on.

I spoke to Chris Thompson who runs Bioforce, a niche provider of biological control agents for pests and diseases of horticultural crops. He works with tomato growers nationwide and filled me in on the obstacle course they have been running lately. Staffing shortages are probably the biggest stress, many growers are barely maintaining operations with 40 to 50 percent of their pre-Covid-19 staffing levels. I always find plenty of tomatoes when I want them, so these reduced teams must be logging some serious hours to get my snack to me.

> "Staffing shortages are probably the biggest stress, many growers are barely maintaining operations with 40 to 50 percent of their pre-Covid-19 staffing levels

Transportation is the next chokepoint, because of labour shortages but also increased regulations, road closures around lockdowns and rising fuel costs. Tomato growers battling whitefly incursions depend on Bioforce for a solution: weekly shipments of live domestically bred *Encarsia*, a parasitic wasp which, when released in the greenhouse, will feed on and parasitise whitefly. That's a terrific system when it works, but delivery timelines have been shattered. Ideally the "good guy" insects, as Chris calls them, should leave his facility and be released at their destination within a few days. Now they are sitting in vehicles or depots for a few *weeks* exposed to extreme conditions. One package he sent before Christmas just arrived the first week of March.

Every delivery of dead biocontrols means growers might turn to their chemical arsenal to battle the whitefly. Who has time for expensive, time consuming spraying?

In addition to basic operational disruptions, growers face selling in a highly competitive market, in which independent retailers have dwindled while the supermarket duopoly drives down growers' margins. At the same time, regulatory pressures from NZGAP (Good Agricultural Practice), changes in the Emissions Trading Scheme and rising inflation occupy the head and desk space of every greenhouse manager.

> "Growers take all the work off my plate by delivering perfectly ripe succulent tomatoes

Growers take all the work off my plate by delivering perfectly ripe succulent tomatoes. Other crews back the growers. TomatoesNZ represents growers, working with lawmakers, gathering research and churning out fact sheets on pests and diseases to watch for. The Find-A-Pest app, developed by collaborators at Scion Research and Lincoln University as part of the Biological Heritage National Science Challenge, is available free to all growers to quickly photograph, report and get identification on a range of pests and diseases. Reporting of pests is critical to ensuring quality data is available to manage existing pests and support early detection of new pest species. Additionally, *A Lighter Touch*, a seven-year, $27 million programme, is taking an evolved approach to IPM (Integrated Pest Management), deploying agroecological methods in trial programmes with the aim of reducing crop protection's chemical footprint.

With support and tools in place growers can be ready to spar with new contenders when they arrive: Tomato Brown Rugose Fruit Virus (ToBRFV), the tomato leafminer (*Tuta absoluta*) or Tomato Red Spider Mite. I'll keep buying tomatoes right through winter, and I'm not alone – the average New Zealand household eats nearly 10kgs of them a year. Now that I know every sweet juicy bite includes funding for scientists, advocacy and reduced emissions and agrichemicals, I'm willing to pay top prices.

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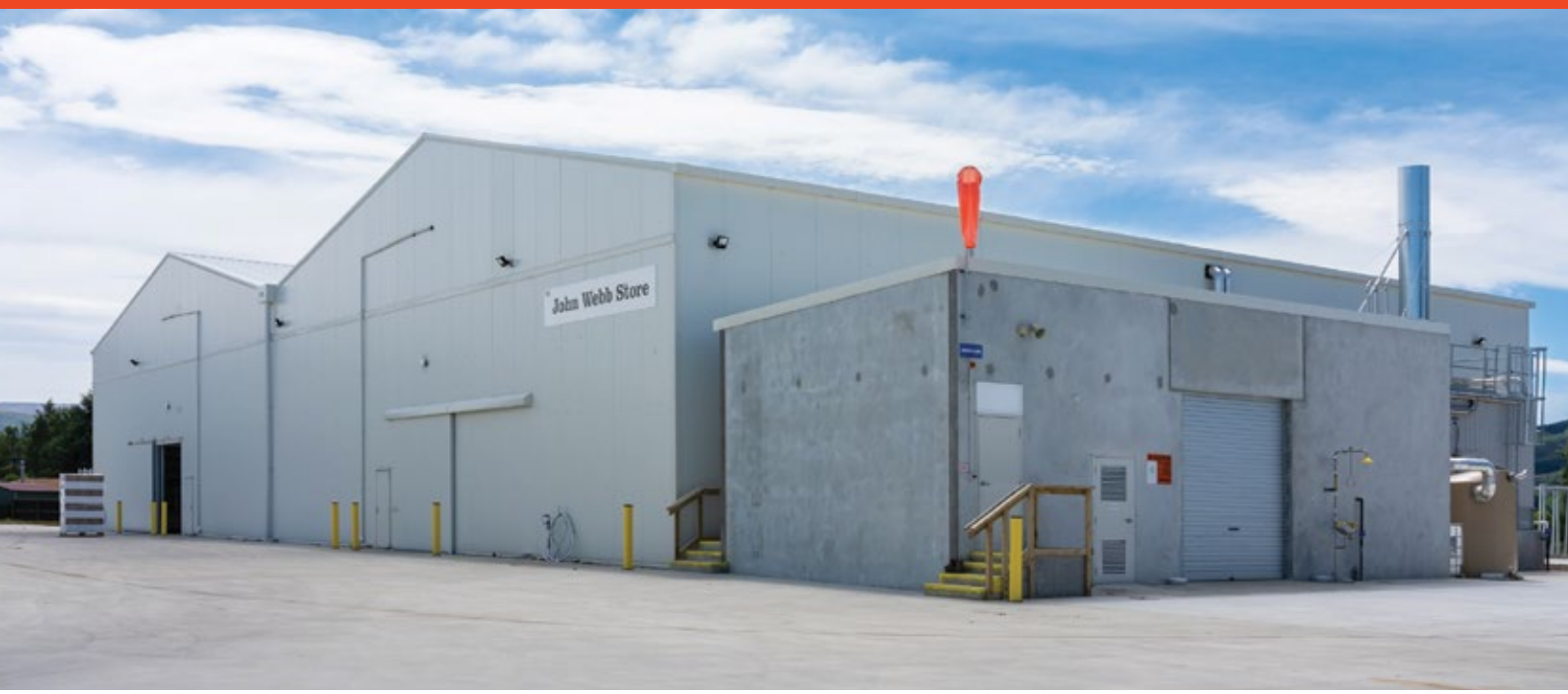

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SMART TECH WON'T REPLACE HUMANS AND DOGS

Elaine Fisher

A 3D scanner being trialled at Auckland Airport by Biosecurity New Zealand

Electronic 'noses', 3D X-ray technology and the use of machine-learning algorithms will play a part in keeping our borders safe, but will not replace dogs and humans completely says Biosecurity New Zealand's northern regional commissioner Michael Inglis.

"We are investing in technology and the results are positive, but it is not the answer to everything, and we don't want to put all our fruit into one basket," he told the Tauranga Moana Biosecurity Capital online partner's forum in February.

"Biosecurity is not about just one aspect. While we are looking to future technology, human intervention is still required, and Biosecurity New Zealand has talented, extremely experienced, professional people from all walks of life on its team."

In May last year Australia and New Zealand began collaboration on a project to develop and trial world-leading auto-detection algorithms for 3D X-ray technology to enhance biosecurity screening and speed up travel. Michael said the new technology is significantly more efficient than 2D X-ray.

3D X-ray technology can automatically detect fruit, vegetables, meat, seafood and plant material and has been twice as effective in an airport environment and more than three times more effective in mail centres when compared to other detection technologies.

"Eventually we may be able to detect a biosecurity threat in a suitcase in Australia even before it is loaded onto a plane."

The Covid-19 pandemic had led to a dramatic decrease in passengers arriving in New Zealand on aircraft and cruise ships. Biosecurity New Zealand had redeployed many people to other areas of its operation due to the drop in passenger traffic. With the borders reopening, a recruitment process was underway to increase staff numbers, he said.

All luggage brought in by passengers would continue to be X-rayed and detector dog screening would return to international airports. Planning is underway for biosecurity measures around cruise ships once they begin operating again.

New scanning technology will also be installed in the NZ Post $100 million-plus mail centre due to open in 2023 at Wiri in Auckland. This will include 3D X-ray and Rapiscan Systems real time tomography (RTT). The centre is being built in response to the dramatic increase in online sales largely due to Covid-19 lockdown restrictions.

> **"While we are looking to future technology, human intervention is still required, and Biosecurity New Zealand has talented, extremely experienced, professional people from all walks of life on its team**

Biosecurity New Zealand continues to closely monitor container and other cargo arriving in New Zealand. Michael said the 'maturity' within the maritime industry has improved significantly with vessel captains often reporting suspected risks to authorities. However, there are still issues with incorrect or even fraudulent paperwork associated with incoming containers.

Michael Inglis, Biosecurity New Zealand's northern regional commissioner

During the forum's question time, Barry O'Neil, HortNZ president and chairman of directors asked if Biosecurity New Zealand was still using intelligence gathering to assess the risk from offshore.

Michael said Biosecurity New Zealand still has a clear focus on gathering biosecurity intelligence in terms of pests and disease risks from offshore. "We are working with partners to look at risks, including from the brown marmorated stink bug (BMSB) and the changes which are happening globally and in our hemisphere."

> **"Biosecurity New Zealand still has a clear focus on gathering biosecurity intelligence in terms of pests and disease risks from offshore**

Since Stu Hutchings was appointed chief biosecurity officer for the Ministry for Primary Industries last year there had been a serious reassessment of the value of intelligence gathering and risk assessments and the work of the directorate.

The directorate had increased what it was doing to improve outcomes but because of the nature of its undertakings Michael said the results were not "always as visible as they could be."

URBAN MICROGREEN OPERATION
EXPANDING UP THE COUNTRY

Helena O'Neill

Bibhas (Benji) Biswas runs urban microgreen operation Crunchy in Invercargill

New commercial premises for Southland microgreen grower Crunchy will allow increased production and help propel expansion into the North Island.

In February Bibhas (Benji) Biswas moved his urban farming operation from the garage and backyard of his family home in Invercargill to a 600m^2 commercial building in the inner city.

Benji says the warehouse offers 500m^2 of growing space, with the remainder as office space.

When Crunchy first started up as a one-man operation in 2019 it was solely supplying restaurants, but then the pandemic hit. By last year Crunchy was supplying 40 restaurants, cafés, hotels and shops, but ongoing Covid-19 restrictions and lockdowns continued to put pressure on the hospitality industry.

Moving into retail stores saw sales increase ten-fold in about six months, meaning Benji needed to find a larger space for growing.

Now Benji employs one other full-time staff member along with five part-time workers and hopes to create another full-time role to take on the administration side of things to free Benji up for marketing and product development.

Benji's ongoing vision is to keep finding new possibilities for microgreens while minimising any food waste. With the shifting of the business from the family home to commercial premises, Benji now has the space at home to run his research and development projects.

Crunchy products are stocked in New World, Pak'nSave, SuperValue and Four Square across the South Island, with stores in the lower North Island beginning to sell Crunchy microgreens from mid-March.

Benji hopes to do a deal with Progressive Enterprises and get his products into Countdown stores too.

> "Benji's ongoing vision is to keep finding new possibilities for microgreens while minimising any food waste

Creating a business just before a pandemic and keeping it afloat is a challenge, one that Benji says requires you to be willing to adapt in an ever-changing environment.

This month [April] Benji plans to launch a new product range – dehydrated microgreens.

These will be available as a salt blend, pepper blend, and straight dehydrated microgreens.

"Why only salt when you can add goodness and value to your food? It's another way for customers to try our microgreens."

The dehydrated microgreens also allow Crunchy to reduce its food waste, Benji says. "I'm really excited to bring that into reality."

> "Why only salt when you can add goodness and value to your food

He also hopes to be able to launch the dehydrated products in the Australian market as he believes there's nothing else of its kind currently available.

In January, Benji was awarded the Meridian Energy One to Watch while the business received the PowerNet New and Emerging Award at the Southland Business Excellence Awards.

"It was fantastic to be recognised and it encourages me to try more things."

BALANCING ACT FOR EGGPLANT PRODUCER

Geoff Lewis

Photography; Trefor Ward

Juliette de Brianson twisting stems and pruning side shoots to encourage eggplants to grow vertically

Working with plants that can grow to nearly 5m tall, New Zealand's largest producer of eggplant faces a series of balancing acts in growth factors, energy, markets and labour.

CSM Ltd or Forestburg Eggplants is based at Dairy Flat north of Auckland and produces the large majority of the national crop.

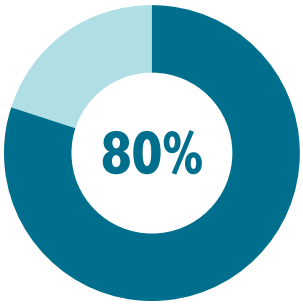
Eggplant – so called in North America, also known as aubergine in the United Kingdom – is an Old World member of the nightshade (Solanaceae) family to which its New World cousins tomatoes, potatoes, chilli peppers and tobacco belong. Regarded as a fruit, it is believed to have been first domesticated in Southeast Asia.

For Forestburg Eggplants, the story begins when managing director Kees van der Eijk and business partner Svend Pedersen decided to buy an existing glasshouse and hydroponic operation at Dairy Flat in 2001. At the time, that included a 3.5m-high 4,000 sqm glasshouse and packhouse which were about five years old.

They began growing capsicum. But five years later after getting a virus infection in one of the glasshouses, they decided to grow something else in that section for the remaining part of that season.

"We had to find another crop. Everyone was growing tomatoes or cucumbers, so we had a look around the supermarkets and realised no one was doing eggplant. So we planted that and it was so successful that the next year we added another greenhouse and then another."

Forestburg Eggplants now has around 43,000 sqm under glass. Working with Dutch greenhouse designers and following international developments, the structures have progressively got taller as indoor growing technologies developed into 7m-high cathedrals of glass.



THE COMPANY IS RESPONSIBLE FOR ABOUT 80 PERCENT OF THE COUNTRY'S EGGPLANT PRODUCTION

The company is responsible for about 80 percent of the country's eggplant production and provides its product to MG Marketing in Auckland which distributes to centres all over New Zealand.

Production varies depending on the light and heat levels.

Kees van der Eijk with 'Jaylo' variety eggplants

Kees says the aim is to keep production as even as possible throughout the year but 25 tonnes a week is common in winter months, and in summer 40 tonnes and even up to 60 tonnes is possible – but not desirable "as we couldn't give it away when we go up to that volume."

The Dairy Flat operation employs about 20 people. In normal times it needs short-term boosts in labour during certain parts of the production cycle. However, the impact of Covid-19 and the loss of a large part of the backpacker workforce has required closer coordination between production levels and what labour is available.

To achieve year-round production Forestburg does multiple plantings. Grafted eggplants are obtained from Gellert Nurseries and grown hydroponically in rockwool substrate. Once fully grown and harvested the water supply to the plants is turned off. They dry out, are cut down, dropped on mats and mulched. Any refuse of fallen leaves is vacuumed off the floor and added to the mulch. The biodegradable material is then trucked to a local farmer.

Hydroponic glasshouse operations need heat and CO_2 to optimise growth. Many growers use natural gas, but Dairy Flat had no easily accessible natural gas supply. Putting in a pipeline was prohibitively expensive.

However, almost next door was a disused regional landfill which produces methane-rich gas from decades of decaying garbage. Operated by Waste Management Ltd, the landfill gas is used to run engines and generate electricity which is returned to the national grid.

> "25 tonnes a week is common in winter months, and in summer 40 tonnes and even up to 60 tonnes is possible

As Kees van der Eijk explains: "We buy heat. We pump 80-degree (Celsius) water from heat exchangers at the landfill's engines. This comes to us through an underground pipeline 900m in length and goes to our boiler, fired by landfill gas, which boosts the temperature to 95 degrees.

Picking platforms are easily manoeuvred from row to row

Then this is stored in the 600m^3 heat storage tank. This whole system is computer controlled and doesn't need much attention."

However, landfill gas is not the same as the natural gas supplied through New Zealand's national system. Landfill gas is 'sour' and has to be 'scrubbed' of pollutants including sulphur which are returned to the landfill. Forestburg has its own scrubber on-site.

The purified or 'sweet' gas is then used to fire a boiler for CO_2 production and heat. The hot water is pumped through miles of the 2" pipe-rails to keep the greenhouses between 19 degrees Celsius at night and up to 27 degrees during the day. Eggplants love warmth.

Eggplant flower

The CO_2 from the boiler is piped into the greenhouses through permeable ducting.

Water was also an issue to begin with as the area had no bore water. All water used comes from rain off the extensive roof area and is stored in two outside ponds totalling 27,000m^3, Kees explains.

However, while Kees has plenty of personal experience in building and running greenhouses and has close connections with top Dutch greenhouse designers and technologies, New Zealand's growing conditions differ from those in the Netherlands and require specific strategies around light control and ventilation.

Good ventilation is essential but as the closed structures have continued to get larger and much taller, these very tall buildings also have disadvantages when it comes to the climate.

> **"The hot water is pumped through miles of the 2" pipe-rails to keep the greenhouses between 19 degrees Celsius at night and up to 27 degrees during the day – Eggplants love warmth**

"We have had to learn to grow again," Kees says. As he explains, this is not only to ensure the plants get the conditions they need to grow but also to control humidity at a level that does not encourage the growth of pathogens including powdery mildew.

Eggplants have their challenges. The stems of the plants are covered in fine hairs which can float in the atmosphere creating health reactions in some workers. Also "every insect loves eggplants."

> **Now the preference is for fruit in the 300 gram to 450 gram range**

Consumer culinary preferences have matured over the years, following European trends. "When we started in 2007, all you could get was massive eggplants weighing 600 grams or more. Now the preference is for fruit in the 300 gram to 450 gram range. Once you cut an eggplant you've got to use it so smaller fruits are easier to use," he says.

As far as capital construction is concerned, Forestburg built a new packhouse three years ago. Covid-19 disruption delayed the installation of a new grading machine and packhouse automation equipment, but they installed it themselves after importing it from Holland in 2021.

Mature eggplant ready for harvesting

FRESHWATER FARM PLANS FROM A GROWER'S PERSPECTIVE

Anne Hardie

Pierre Gargiulo is using the NZGAP system with the EMS add-on to develop a Freshwater Farm Plan for a vegetable growing business

As the government works on the direction of the national Freshwater Farm Plan regulations, Pierre Gargiulo has been working through his plan to show how the Environment Management System (EMS) add-on to GAP (Good Agricultural Practice) can do the job on the large-scale vegetable growing operation he manages in the Tasman region.

National regulations for the Part 9A Freshwater Farm Plans (FWFP) are being drafted by the government and expected out later this year. They will provide details about where and when those plans will be required, as well as content and aspects such as auditing and certification.

The Freshwater Farm Plan regulations are aimed at better controlling the effects of farming on freshwater across the country. Farms and orchards with five or more hectares of horticultural land will need a FWFP, including owned and leased blocks.

HortNZ advocates for the GAP programmes – NZGAP and GLOBALG.A.P – to deliver FWFPs for horticulture as growers already have those structures in place and they are working well.

More than 90 percent of commercial fruit and vegetable growers in New Zealand have a GAP farm plan for food safety and have access to environment modules such as the EMS add-on. HortNZ considers an alignment between the regulations and horticulture's GAP programmes will enable growers to continue meeting market and regulatory compliance in an integrated and effective way.

Pierre is general manager at JS Ewers on Tasman's Waimea Plains, which grows 12ha of tomatoes, capsicums and eggplants under glass and 19 lines of fresh outdoor vegetables across 220ha. He is also running one of two catchment case studies on the plains with HortNZ and has been developing a FWFP using the EMS add-on to GAP.

"I've always been a believer you're best to do this under your own steam and get on to it early," he says. "If we start proving these systems are effective and working, it highlights we're doing the right thing ahead of any government regulations."

Growers can choose to devise a FWFP in-house or to use an advisor. When developing the plans, Pierre enlisted Agrilink advisor Andrew Barber, who had been involved with designing and testing the EMS add-on, to guide the business through the process. He also put together an experienced team to work alongside Andrew as they had a good understanding of the growing operation and the Waimea Plains.

JS Ewers has 12ha under glass and 220ha outdoors on the Waimea Plains

To Pierre, it makes sense to use the GAP EMS add-on or the industry's current compliance rather than introducing a completely new system.

He says the EMS is still evolving but covers a lot of what growers are already doing and gets it documented in a way that is consistent and can be audited.

"One thing I like about the plan is it's all about improvement – what your status is now and over the coming years, and what you want to influence. It allows you to work through it on a time scale that is achievable."

It has taken a bit of work to set up a system that does that, but in practice he says "the beast wasn't as daunting" as they thought it would be.

"It forces you to formalise more of your decision making. Most of us make those decisions – the EMS helps ensure it is recorded."

> **"One thing I like about the plan is it's all about improvement – what your status is now and over the coming years, and what you want to influence**

Each year, growers must complete a self-assessment of their FWFP and action plan to retain NZGAP certification. Auditors also check these documents and evidence of practices and record keeping during audit.

Along the way, Pierre has worked with the Tasman District Council and collaborated with staff members around practices and planning, which has been good in terms of knowledge sharing and relationships.

At the same time, HortNZ has been working with the council on the science and modelling assumptions for both vegetable and orchard systems ahead of the upcoming regional Freshwater Plan Change. HortNZ is working with local advisers to support growers to develop GAP FWFPs using the EMS.

"Growers need to be engaged with the government and councils in the process because they don't know unless the information is shared. That's key."

He says growers are focused on protecting their soils, not just for next year and the year after, but for following generations, and are constantly improving their systems. That has a flow-on effect to the wider catchment, which in this case is the Waimea Plains.

Pierre says technology is playing a big part in making environmental improvements, such as soil moisture monitors to deliver accurate irrigation and improve environmental performance. Growers are constantly looking at methods to improve efficiency in all areas of their operation, which has financial benefits and that in turn results in environmental improvements.

"We have to make sure that what we are doing is the best we can do and constantly look to improve. That's the beauty about the FWFP."

FINDING NEW ZEALAND INGREDIENTS FROM PRODUCT TO PACKAGING

Anne Hardie

Bags that will break down in the home compost bin

In the past decade Proper Crisps has made its mark in a competitive market by being creative and innovative with its range of products and authentic flavours.

Pineapple salsa tortilla chips made from real pineapple, vegan barbeque rub crisps and very recently a range of handmade crackerbread are part of an expanded range that keeps pace with customers' desire for something different and real ingredients increasingly sourced within New Zealand.

To that it adds sustainability goals that go as far as home compostable bags which will break down in the home compost bin.

The Nelson company's commercial manager and head cultivator, Duncan Kerr, says the company wanted the bags to be compostable anywhere, like the home compost. Each bag is made from home compostable films that are internationally certified and are in the process of certification by New Zealand's Crown Research Institute, Scion, to prove they compost in the New Zealand environment. That is important as every country has different requirements.

Duncan says development is ongoing to get the bags breaking down more quickly, and ultimately to make the material from New Zealand ingredients rather than importing them from overseas to be manufactured here.

That goal extends to sourcing all ingredients in the product line, and the company is already well down the road to achieving that. Potatoes are the easy ingredient to source, with Agria the main variety of choice. A fair chunk of the potatoes are grown in Canterbury, with other growers based in Pukekohe and Manawatu, plus organic potatoes from a grower in Hawke's Bay. Purple potatoes from Canterbury have also been added into the mix after finding a grower producing big enough spuds to process.

Duncan says Agria was chosen for its taste to add more flavour to the crisps, even though it meant adjusting machinery to handle the variety which doesn't come in a nice, uniform shape for processing. (The crisps' English founder used the term crisps and it has been retained to distinguish the hand-cooked crisps from mass-produced chips.)

"We just retrofit everything we do to produce a better crisp."

Since 2020, Proper Crisps has been transitioning to New Zealand sunflower oil from Pure Oil NZ which also supplies The Good Oil company, and they are working together to increase supply.

"It turns out sunflower growing in New Zealand is beneficial for all involved."

Proper Crisps heading through the process in Nelson

It has been harder sourcing some of the other ingredients such as seeds and spices from New Zealand, but Duncan says that will happen over time.

"When you're dealing with authentic ingredients like plants, it takes time."

Creating new lines and flavours is a team affair using their collective sets of tastebuds to sample endless bags of crisps or tortillas to decide what works well and will appeal to customers. Duncan says the company is fortunate to have a strong bunch of foodies who can take ideas from other countries or recipes and test them for the New Zealand market.

> **"A fair chunk of the potatoes are grown in Canterbury, with other growers based in Pukekohe and Manawatu, plus organic potatoes from a grower in Hawke's Bay**

"A group of us get together every couple of weeks to try different variations. We've had more than 40 versions of some flavours – we do lots of sampling to get it right. We don't deny we're selling a more expensive bag of chips, so the product has to taste excellent every time."

One of the flavours created by the group is the pineapple and salsa tortillas which have real pineapple that has been dehydrated by a local company to lock in the flavour. A hint of mango and jalapenos are added to give the tortillas the sweet and sour flavour.

For the past few months, the company has been ramping up production of its crackerbread line. Proper Crisps' owners, Ned and Mina Smith, bought a small local business that was making the Danish seed cracker knaekbrod, back in 2020 and now have a kitchen set up to handle larger lines. So far, they have four flavours, but in line with the company's philosophy to bring better products to market for its customers, another two flavours are in the wings.

Duncan says the company will continue to expand its product lines and source more New Zealand products from growers as they become available.

The company has just begun processing in Australia to build up capacity to supply its domestic market as well as other export markets.

Aiming for authentic flavours and New Zealand ingredients

WEATHER, LABOUR AND COST CONCERNS

Glenys Christian

The last season was a tough one for strawberry growers due to the weather which meant many finished picking earlier in the season than usual and exports were down.

"It was very wet through the spring," Strawberry Growers New Zealand (SGNZ) chair, Anthony Rakich says.

"There were four weeks in October when the rain didn't let up."

November brought hot weather, then more rain and after that it turned hot and dry for the whole summer period, which meant *Botrytis* rots were a big problem as affected fruit had to be graded out. While second grade fruit which is small or misshapen can still be sold, rotted fruit is left on the plants in the paddock.

"Production was down but that meant prices were good," he says.

The result was that many growers opted to finish exports to Asian countries such as Thailand and Taiwan earlier than they normally would. Higher freight costs due to the effects of Covid-19 on shipping also came into play. The export season would usually run from October until the end of January, but many growers stopped sending fruit offshore early in the new year as returns from selling on the local market were the same.

Anthony says despite high local prices there was no backlash from consumers.

"Those are the sort of prices we need to be getting in a good production year."

Labour issues were also a big problem without the number of backpackers and Recognised Seasonal Employer (RSE) scheme workers usually in the country over harvest time.

"I heard of some growers who stopped harvesting some of their blocks because they couldn't get pickers," he says.

"They just had to leave some and walk away from them."

Growers with strawberries in tunnel houses particularly relied on RSE workers and others on backpackers usually readily available during summer. Even those growers who usually employed labour from around their local area were concerned as to how they would cope.

"We hope the situation will ease for next year," he says.

Another big problem is more recent and widespread cost increases.

"The cost of everything is going up," Anthony says.

"Costs are killing us."

That includes fuel, packaging, growing media and for tunnel house growers, fumigation costs. Growers are already as efficient as they can be, changing systems if they could to reduce their production costs. More growers are opting for pick-your-own operations because of the shortage of labour, with a number putting aside some blocks when they ran short of pickers.

> "The cost of everything is going up ...costs are killing us

"There's good demand from the public," he says.

"I get phone calls from November asking me if people can pick their own."

Usually, he will leave one small block on his Danube Orchards, north-west of Auckland, for this purpose, but last season he stopped picking two weeks earlier than normal, turning a larger area over to the pick-your-own trade.

"Because it was too hot the fruit quality just wasn't there," he says.

Strawberry grower numbers remain fairly constant despite pressures on the industry.

"There are a few new growers coming up, but plant numbers remain about the same," he says.

While one large grower, Perry's Berries, which grew a large area of strawberries at Mangere, has left the industry, other growers have come along to fill that gap. There are several smaller growers getting into the business in the central North Island, with more of them growing strawberries in tunnels.

> **"Growers are already as efficient as they can be, changing systems if they could to reduce their production costs**

"It takes a while for smaller growers to build up production," Anthony explains.

"A lot depends on how they do in their first season."

Looking to the future, SGNZ's programme investigating integrated pest management (IPM) solutions for thrips is now in its third and final year. The hope is that results will show how growers can use fewer sprays to stop any resistance building up.

"What's important now is keeping our plants healthy," he says.

SGNZ is also keenly watching importations of new varieties to see whether any will be an improvement on the varieties currently grown.

"It could be a good thing if they handle the weather better or pick more easily," he says.

"If there's a standout we will see a big shift. But a lot of the varieties brought in don't do well in New Zealand conditions."

While Camarosa is the largest crop of the different strawberry varieties grown, the amount planted in the second largest variety by crop volume, Monterey, is increasing due to its longer fruiting season.

And there's no let up in growers' efforts in looking for new export opportunities.

"We're trying to get into Vietnam, but we're not there yet."

SUPER GROWTH FOR SUPIE

Glenys Christian

Fruit and vegetables being packed at Supie's warehouse – Nick, Sarah Balle and Cahan

Online supermarket, Supie, has gone from strength to strength in the nine months since it was launched, and has even bigger plans for the future.

Sarah Balle, who founded the company, grew up on a Pukekohe vegetable growing property and saw for herself the amount of wastage caused by the long supply chain between supplier and end customer. Not only does the produce of many fruit and vegetable growers not meet supermarket standards, even if it did, they achieve small margins.

Sarah is also very aware of the carbon emissions from dumping food in landfill when a growing number of New Zealand children are living in food poverty. It's estimated that seven million kilograms of fruit and vegetables is wasted every year in this country at a cost of $1 billion.

So Supie was launched in June last year with 1000 members in the Auckland area, offering a 48-hour delivery window from its south Auckland warehouse in Wiri. There were just ten staff handling the 2000 products on its virtual shelves and just over 100 suppliers. Supie welcomes smaller brands and artisans not producing on a large scale, which means that its customers are able to enjoy products they might not be able to find in their local supermarket.

As well as deals, discounts and free product samples, Supie also offers cashbacks which regular customers can use or donate. Now it's grown to have 16,000 members, who enjoy same-day delivery which is free if their order is over $70. There are 25 team members involved, with personal shoppers handling over 5000 products which come from more than 300 producers.

> **"We love being able to educate consumers on produce and introduce them to fruit and vegetables that they wouldn't typically buy in a traditional supermarket**

Sarah, who trained as an accountant, says Supie's produce department offers some of the freshest fruit and vegetables to be found in Auckland.

"Our produce bundles make up a significant portion of our sales," she says.

"Our customers often showcase the produce they receive on social media and to our 7000 Instagram followers. We love being able to educate consumers on produce

Personal shopper Cahan

and introduce them to fruit and vegetables that they wouldn't typically buy in a traditional supermarket. For example, our 'seven surprises' produce bundle and $20 'seasonal bundle' has included twist melons and last week, kohlrabi."

Supie customers often say they can't believe how long the produce they receive has lasted and its quality, she says. Many say their deliveries make it easy to eat healthily, they have appreciated seamless deliveries over lockdown periods, and are impressed with the lack of plastic packaging. Some say vegetables such as cauliflower and spring onions are as fresh as if they'd picked them from their own gardens. Also stocked are a growing range of other grocery items such as milk, cereal, spreads, pet food, toilet paper and beer and wines.

Sarah says Supie has big plans, including taking the company nationwide.

"This requires significant investment, so we will continue to focus on the Auckland market until we raise the funding to expand," she says.

Asked about the Commerce Commission investigation into the supermarket sector she says it was a once-in-a-decade opportunity to make a meaningful change to set up a fair food future and a better outcome for every New Zealander.

"We believe the recommendations don't deliver on creating the fair food future that we want to see for decades to come," she says.

"We don't believe that the price of food at the checkout will go down for consumers, and believe that the supermarket duopoly will continue for the foreseeable future."

But the sector still needs to improve and positively contribute to everyday consumers.

"Supie is the force for change, and a better tomorrow will only be achieved if Kiwis support the mission for better and fairer access to food in Aotearoa," she says.

"We have unwavering commitment and will continue fighting for New Zealanders, food producers, and future generations."

A POSITIVE NEED TO KNOW MORE

Glenys Christian

Squash flower

Agronomist Emily Maclean believes having to calculate nitrous oxide emissions from fertiliser will incentivise vegetable growers to be more proactive about what they're doing.

"They're already trying to make their businesses as profitable as possible," she says.

"But it's incredibly positive that they will need to know more. The key point is whether they're recording exactly what they put on and when."

She works for Hawke's Bay company, NH Packing and Farming, which has been growing squash and pumpkin for the last 30 years for both the domestic and export markets. While it leases 600 hectares of land from Bayview, north of Napier, through to Wallingford, southeast of Waipounamu, it also has contract growers across 230ha of land growing squash. The export market, mainly to Asia, takes 90 percent of the squash and pumpkin shipped from its Whakatu packhouse during a season running from January to May. NH Packing is part of the integrated marketing company Three Good Men, along with Gisborne supplier Coxco, and Auckland-based exporter Freshco. The domestic supply season runs from February to December.

The emission calculation – that Emily has already worked through – is all part of readying growers for coming changes to the way in which agricultural greenhouse gas emissions are to be priced by 2025. The pricing system is being designed through the He Wake Eke Noa, a partnership between industry, iwi/Māori and government, in which HortNZ represents horticulture.

Agricultural greenhouse gas emissions are methane and nitrous oxide from animals, and nitrous oxide from synthetic nitrogen fertiliser. By the end of 2022 owners of all farms of over 80ha need to know their total annual emissions number. This is one of seven milestones in the Climate Change Response (Zero Carbon) Amendment Bill 2019 that He Waka Eke Noa is working towards between now and 2025. The partnership is also developing a practical framework to support farmers and growers to measure, manage and reduce agricultural emissions. Included in this is an approach to recognise on-farm sequestration from a range of woody vegetation including orchard trees and bush blocks, and other potential mitigations that can reduce agricultural emissions on farm.

Recommendations from He Waka Eke Noa will be reported to ministers by 31 May this year after broad primary sector engagement to present and hear feedback on the two emissions pricing design options, the farm-level levy or the processor-level hybrid levy.

Emily says NH Packing and Farming is still trying to work out some of the details of what the pricing scheme under the new regulations might mean for it, but has plenty of information on hand to comply with whatever would be required. Around 80 percent of the area it crops is dryland, and while it would like to be able to access more irrigated land, that is becoming harder and harder to find. In response to dry conditions, granular fertiliser can be reduced at planting and supplemented by more foliar sprays.

Soil testing is carried out annually to see how nitrogen levels are shifting, and that dictates what fertilisers are applied where and when.

"And we are sharing that information with landowners because that helps them in their future decisions," she says.

"It's a win:win for us and our growers. We're responsible for the land as its custodians. We want to manage that process as well as possible."

This attention to detail has allowed a refining of fertiliser inputs in order to minimise losses – which could be to the atmosphere through nitrous oxide or leaching through soils into the water – as much as possible.

That's particularly important for pumpkin and squash as too high levels of nitrogen going on can increase crop canopy growth which can be detrimental to fruit yields.

The company selects naturally fertile blocks for cropping, which also reduces inputs needing to go on. In the future Emily would like to run some trials looking at further reducing these so minimal inputs can be applied during the growing cycle. At present trial work is concentrating on biological crop treatments in response to consumer preference for fewer chemical inputs.

Landowners of the leased blocks often want to return their paddocks back into grass quickly, which can help utilise excess fertiliser left over from cropping. Winter wheat and oats are now being investigated as part of the rotation system.

> **"By the end of 2022 owners of all farms of over 80ha need to know their total annual emissions number. This is one of seven milestones in the Climate Change Response (Zero Carbon) Amendment Bill 2019 that He Waka Eke Noa is working towards between now and 2025**

Emily attended one of the two HortNZ grower Zoom calls held in February on He Waka Eke Noa, then was able to go through the emissions calculator with one of its staff.

Squash field

"Growers are flat out and assisting them with compliance is an effective way of keeping them involved," she says.

"If you've kept records of all your inputs, it's straightforward to generate the emissions data and know your annual emissions number."

NH Packing uses Greenlight software, a British-designed system to record its chemical applications. But Emily says specialty software is not required – the key component is maintaining accurate records.

TECHNICAL

THE LATEST INNOVATIONS AND IMPROVEMENTS

FLATTENING THE CURVE – HORTICULTURE STYLE

Eve Pleydell : HortNZ risk policy advisor

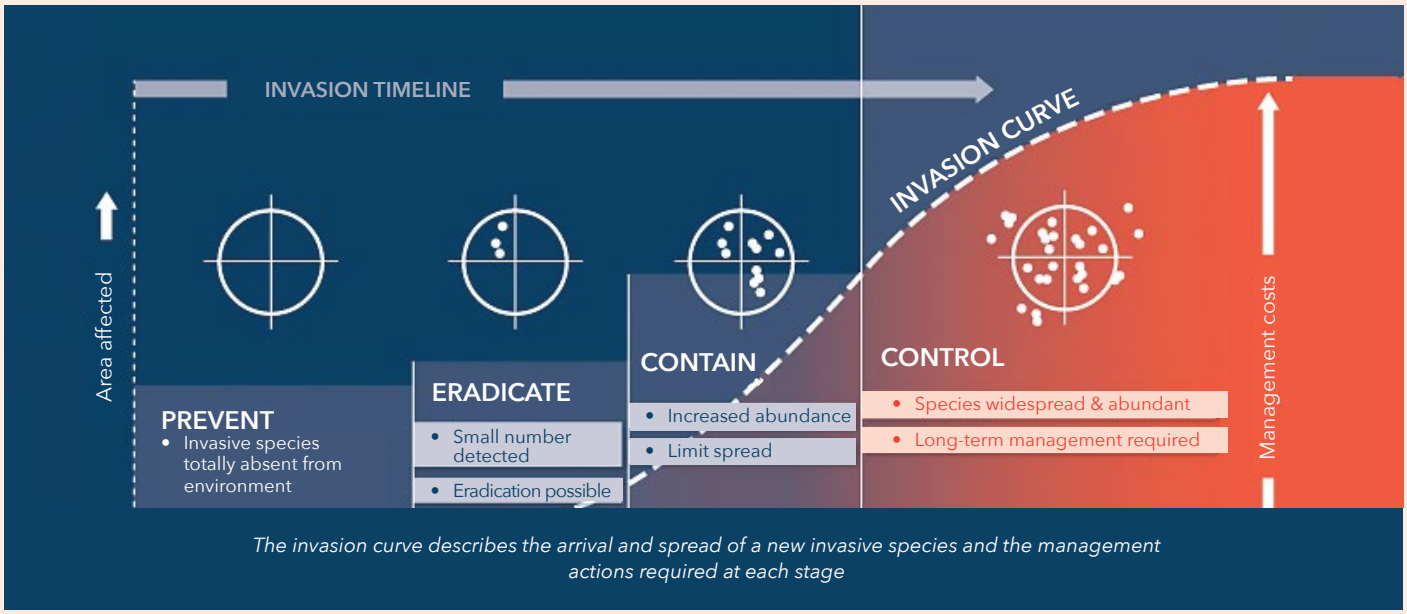


Figure 1: *An invasion curve showing how control options change as the size of an invading pest population increases over time and across larger areas of a country. In reality, knowing when eradication is no longer feasible or when long-term management is the only real option left is not straight forward. Image sourced from Invasive Species Council, Australia. Invasion-Curve – Invasive Species Council*

If a new plant pest enters the country, everyone one wants to get rid of it as fast as possible but sometimes eradication is not possible. What can growers do to help flatten an invasion curve?

Key points

- Eradication of an invasive pest or disease is not always feasible.
- Alternative options include trying to contain or manage the pest.
- At all stages of the invasion curve growers can minimise the risk to and impacts on their business by using good on-farm biosecurity practices.

In New Zealand we are fortunate to be free from many pests and diseases that occur in other countries. To protect this status and support our primary industries we impose some of the strictest biosecurity border controls in the world.

However, as the international movements of people, goods, and mail increases, our country is coming under greater invasion pressure from unwanted pests and diseases and it is not possible for border controls alone to provide 100 percent protection.

When an invasive plant pest is detected in New Zealand for the first time, the Ministry for Primary Industries (MPI) works with the affected sector to control the local situation, assess the national situation, and decide on the best control strategy. While eradication of the pest is often the most desirable outcome, the chances of eradication being successful decreases as the length of time the pest has been here and the geographical distance it has spread over increase.

Eradication is also more difficult if the pest is biologically programmed to be a successful invader. For example, pests capable of spreading across long distances fast, or that reproduce rapidly, or that are hard to detect early are likely to be more challenging to eradicate.

Think of the difference between the original strain of Covid-19 that as a country we successfully eliminated

using lockdowns and the Omicron strain that spreads far too quickly for elimination to be feasible. Sometimes a strategy other than eradication is forced upon us by the characteristics of the situation.

> **It can be the actions of growers that stop a pest in its tracks and achieve eradication, as demonstrated recently by the pea growers of Wairarapa**

The pest control options available at different stages of an invasion can be illustrated using an invasion curve. If the size of an invading pest population is already too large for national eradication to be successful, it may still be possible to contain the infestation in a particular part of the country using localised control measures. However, if the pest has well and truly established itself then we all have to learn to live with it and develop the best long-term management strategy to minimise its negative impacts.

In recent years, the United Kingdom and Australia both made quite rapid decisions not to pursue eradication of a significant invasive plant pest. (See the case studies below.) Instead, they focussed on industry, science and government working together to flatten the invasion curve by developing long-term management strategies that effectively minimise pest-related damage and impacts.

Growers play key roles at every stage of an invasion curve. While some actions may be mandated on growers by MPI as part of a biosecurity response, enhancing general biosecurity practices on farms is also important for pest and disease control. It can be the actions of growers that stop a pest in its tracks and achieve eradication, as demonstrated recently by the pea growers of Wairarapa. But when a pest or disease does become locally or nationally established it is also the growers who are the main players in preventing huge population explosions that then become very challenging to control. The actions we take here within New Zealand are critical parts of the overall biosecurity system. Border protection alone cannot keep our businesses and communities safe from harm from unwanted pests and diseases, but there is a lot growers can do to mitigate the risks posed by these invaders to their own farm and the country.

CASE STUDY A: SPOTTED WING DROSOPHILA (SWD) IN THE UNITED KINGDOM

Spotted wing drosophila is a small fly that likes to lay its eggs in underripe, thin-skinned fruit before harvest. The fly larvae then destroy the fruit pulp as they feed, producing sunken blemishes in quality fruit. Suitable hosts include berries, stonefruit and grapes. The species originated in Asia, although it was detected in Hawaii in 1980. In 2008, it started to spread through North America and Europe reaching south east England in 2012 (CAB International, 2021).

This fly can spread locally by flying and also moves rapidly over larger distances through the movement of infested fruit. The fly's high reproductive rate and ability to produce up to 13 generations per year make it a formidable pest to eradicate.

Because of the fly's biology, official European Union control measures had been unable to stop SWD from spreading across the continent and the fly was deregulated at the EU level in 2012. Soon after its detection in England, a government-industry-scientist working group was established.

The group was chaired by a fruit grower and enabled information to be shared effectively about the spread and impact of the pest and how to best control it (Agriculture & Horticulture Development Board, 2017). Information gaps were identified and research initiated to provide some answers.

A code of practice for fruit growers and packhouses was produced, using lessons from neighbouring countries and incorporating the results from UK-focussed research as they become available. Active monitoring of SWD populations by growers plays a key role in early detection of the fly in an orchard, which enables early control and targeted spraying of SWD effective pesticides. As the adult flies feed on waste fruit, the careful disposal of damaged fruit to remove that food source is another critical control point to avoid population explosions of SWD. Stringent orchard hygiene practices also help to prevent movements of the fly between orchards.

When SWD first arrives on a farm the impacts can be severe with some growers reporting significant crop losses. However, using an integrated pest management (IPM) approach has resulted in satisfactory levels of commercial control being achieved in future years. Being ready to adopt new practices early can help growers minimise losses in the first few years of living with a new pest.

CASE STUDY B: FALL ARMYWORM (FAW) IN AUSTRALIA

Fall armyworm is actually a moth whose caterpillars feed in large numbers on over 350 species of plants, including some vegetables and fruits, although it prefers maize, sorghum, grasses and cereals. This species is native to the Americas but from 2016 it started steadily moving across the globe before being detected in the Torres Strait in January 2020. Detections soon followed in Queensland (February) and the Northern Territory (March). The most likely entry route to Australia was wind-assisted flight. Genetic typing of the moth is underway to increase understanding of when, from where and how often this pest has entered Australia (Plant Health Australia, 2020).

Fall armyworm is a formidable pest. Under favourable conditions this moth can fly hundreds of kilometres over several nights. This moth can also reproduce quickly, with a single female capable of producing up to 1,500 eggs during her life, and a lifecycle that can be completed within 23-27 days.

The biological characteristics of the moth coupled with widespread detections across large geographical areas of Australia led the Consultative Committee on Emergency Plant Diseases to conclude that it was not possible to eradicate this pest from Australia. The decision to opt for long-term management was announced on 24 February 2020 (Government of Western Australia, 2021).

What does living with FAW look like for Australian horticulture?

- The government surveillance system continues to monitor the distribution of the moth using pheromone traps and public reports. Regular updates are issued to let growers know if it has entered a new area.
- Sectors such as the grains industry have produced continuity plans for their growers who are encouraged to regularly check their crops for signs of infestation to allow early detection on a farm. In Australia, it has been suggested that targeted spraying should be used only once the scale of the infestation has reached threshold levels. Indiscriminate use of pesticides is not recommended as this moth has developed pesticide resistance in some countries, and spraying may also affect natural predators of the moth (Cesar Australia, 2020).
- On-farm biosecurity practices help to protect crops such as instigating a 'clean-on, clean-off' policy for the farm and controlling weeds to remove potential host plants.
- To support the growers, a body of research is underway to help optimise control efforts in the Australian setting. This research includes identifying the most effective insecticide programmes, investigating possible biological control mechanisms, and improving predictions of seasonal migrations in order to best forewarn growers that the moth could arrive in their area.

The FAW infestations are expected to be severe for the first few years after its arrival but, as has been seen with other pests that have arrived in Australia, the annual impacts are expected to decrease with time (Queensland Government, 2020). This decrease will likely occur as the most effective control tools are identified and the affected industries become more skilled at controlling it. Natural predators of the caterpillars are also expected to increase in number.

References

Agriculture & Horticulture Development Board. (2017). Knowledge Library. *Containing the spread of spotted wing drosophila* (SWD). Kenilworth, Warwickshire, UK. Retrieved 03 10, 2022, from https://ahdb.org.uk/knowledge-library/containing-the-spread-of-spotted-wing-drosophila-swd

CAB International. (2021). Drosophila suzukii (spotted wing drosophila). *Invasive Species Compendium*. Wallingford, Oxon, UK. Retrieved 03 10, 2022, from https://www.cabi.org/isc/datasheet/109283

Cesar Australia. (2020). Fall Armyworm Continuity Plan for the Australian Grains Industry, Version 1. Canberra: Plant Health Australia. Retrieved 03 10, 2022, from https://www.planthealthaustralia.com.au/wp-content/uploads/2020/11/Fall-Armworm-Continuity-Plan-2.pdf

Government of Western Australia. (2021, July 05). Fall armyworm in Western Australia. *Dept of Primary Industries & Regional Development*. Perth. Retrieved 03 10, 2022, from https://www.agric.wa.gov.au/fall-armyworm-western-australia

Plant Health Australia. (2020). Fall armyworm. Canberra, Australia. Retrieved 03 10, 2022, from https://www.planthealthaustralia.com.au/fall-armyworm/

Queensland Government. (2020, March 05). Fall armyworm – should you be concerned? *The Beatsheet*. Brisbane. Retrieved 03 10, 2022, from https://thebeatsheet.com.au/fall-armyworm-should-you-be-concerned/

NITROGEN BALANCE – UNDERSTANDING MANAGEMENT AND ENVIRONMENTAL IMPLICATIONS OF NITROGEN USE IN CROP PRODUCTION

Bruce Searle, Trish Fraser, Jo Sharp

Nitrogen (N) is a key nutrient for the successful production of crops, and each year growers invest significantly in applying N fertilisers. However, not all the applied N is used by the crop – and some can potentially be lost to the environment.

This environmental N loss occurs via different pathways that include leaching (nutrient loss in drainage), run-off, or gaseous losses (via processes known as volatilisation and denitrification). Measurement and monitoring of each individual pathway is complex, and involves having the right equipment and expertise.

In the Sustainable Vegetable System (SVS) project we have developed a method to calculate an N balance to help understand how different production systems and N fertiliser inputs change the amount of N that is potentially at risk for environmental loss (Figure 1).

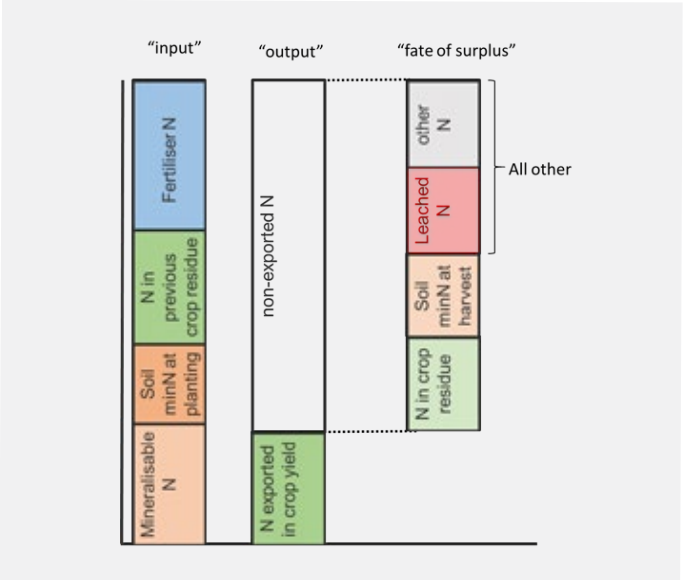


Figure 1: *Framework for nitrogen (N) balance. This balance identifies the 'non-exported N' (i.e. the N in the system that is over and above that exported in marketable yield) and where the 'non-exported N' is allocated within the system. The 'all other' pool reflects within season environmental loss, and can be further split into leached and other (gaseous) losses if values can be quantified*

The N balance is based on the idea that every crop exports a certain amount of N in the sold product. Usually more N needs to be supplied than is exported, which leaves additional N in the system. This N that is not exported becomes part of different pools of N in the crop system where it can be susceptible to loss. Calculating the N balance helps to identify in what pools this 'non-exported N' ends up, and helps us better understand N use in the system and the risk of N losses.

An example

We used this approach to calculate the N balance (see Figure 2) for data from broccoli grown in a field experiment as part of the SVS project at the Plant & Food Research farm near Lincoln in Canterbury, with fertiliser application rates of 60 kg N/ha (Medium N) and 120 kg N/ha (High N).

Fertiliser N was applied as calcium ammonium nitrate (CAN) in three equal side-dressings. All other management was the same. The broccoli (cultivar 'Nobel') was transplanted on 3 March 2021 and harvested in a single cut on 1 July 2021. Marketable yields were 6.1 t/ha with an application of 60 kg N/ha and 5.5 t/ha with an application of 120 kg N/ha, with the low yields likely reflecting a single-cut harvest.

To calculate the balance, first we need to determine the inputs and outputs from the system.

The N inputs are:

- Mineralisable N – this value was obtained from the Potential Mineral N test (PMN) at transplanting. The results indicate that 86 kg N/ha will be made available to the crops from mineralisation during growth.
- Mineral N – the amount of nitrate and ammonium N in the soil that is immediately available to the crop, measured at transplanting. This was 37 kg N/ha for the Medium N treatment and 54 kg N/ha for the High N treatment.

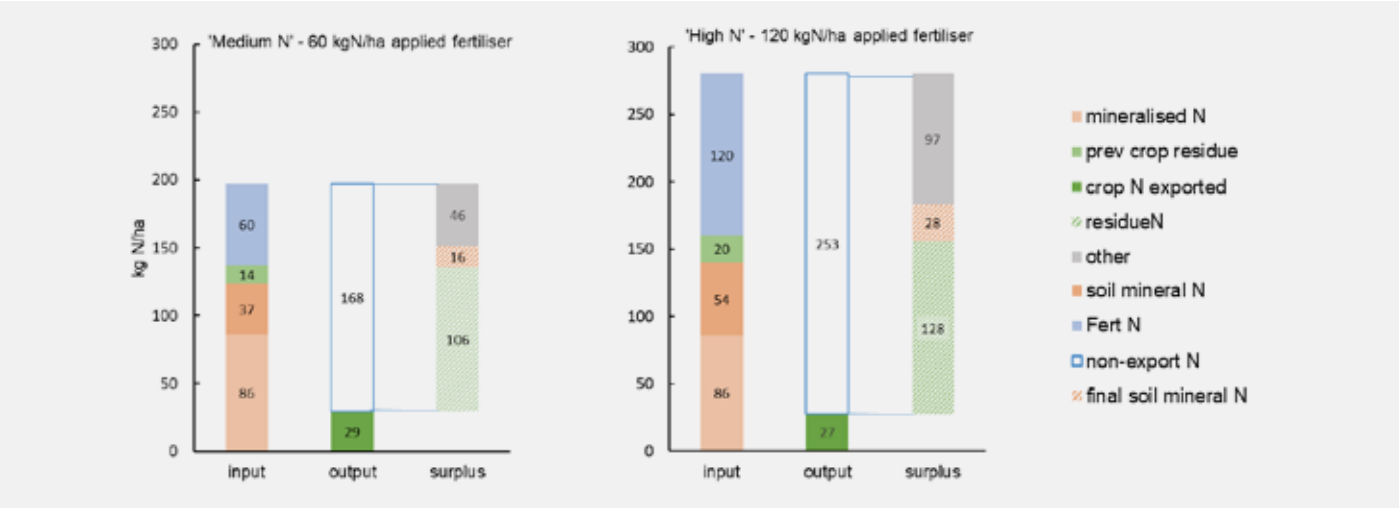


***Figure 2**: Nitrogen (N) balance for a broccoli crop grown under different N fertiliser rates*

- Crop residue N – Stubble from the previous wheat crop was estimated to have provided 14 kg N/ha for the Medium N treatment and 20 kg N/ha for the High N treatment. An assumption is made (for now) that all of the N in the residue becomes available to the crop.
- Fertiliser N – the amount of N applied as fertiliser – in this case 60 and 120 kg N/ha.

This gives total inputs of 197 kg N/ha for Crop 1 and 280 kg N/ha for Crop 2.

The N outputs are:

- Exported N – the amount of N in marketed broccoli was 29 and 27 kg N/ha for Medium and High N treatments, respectively.
- Non-exported N – the difference between the total inputs and exported N was 174 and 253 kg N/ha for Crops 1 and 2, respectively. The non-exported N is the part most susceptible to environmental loss. The question is into what pools of N is the non-exported N allocated? This will have some influence on likelihood of environmental loss. The different pools the non-export N can be allocated to are:

1. Crop residue N. Most of the non-exported N is in the residue – the stem, leaves and non-marketable broccoli that remain in the field after harvest. This was 106 and 128 kg N/ha for Medium and High N rates, respectively. This will be available for the next crop and should influence subsequent fertiliser application rates.
2. Soil mineral N left in the soil at crop harvest. The higher this value is, the higher the risk of leaching after harvest. This amount guides the need for a catch crop or care in fertiliser application in subsequent crops. It can also be useful to consider how a certain mineral-N content was arrived at – good use by the crop, leaching in a season, or excess fertiliser application. These amounts were 16 kg N/ha for Medium N and 28 kg N/ha for High N and are not exceptionally high.
3. 'All Other N' – referred to as 'all other' as it is N in other loss pathways that have not been directly measured (such as leaching, volatilisation or denitrification). The calculated values were 46 and 97 kg N/ha for Medium and High N rates, respectively. As CAN fertiliser was applied and watered in, there is likely to be little loss by volatilisation. Likewise, there was no real flooding due to irrigation or rainfall, so little denitrification. There was, however, a heavy rainfall event in the last three weeks of growth and while it did not lead to flooding in the field, it is likely that a significant portion of this was lost by leaching.

In the SVS project, we are working to obtain improved estimates of how much of the 'all other' pool is actually leached from the system as indicated in Figure 1. Knowledge of how the non-exported N is distributed between the different pools of N can influence management. For example, high soil mineral N at harvest would suggest that a very short fallow or catch crops would be useful to limit leaching losses. A high amount of N in residues suggests that fertiliser rates for the subsequent crops should be adjusted to account for this N supply to the crop. Losses via leaching and 'other N' (Figure 1) should be used to evaluate in-season management and environmental conditions for those outcomes.

This is a simple framework for an N balance of a field or crop within a field. It provides a check on the sustainability and the potential environmental impacts of N management practices. As more balances are completed and evaluated within the SVS project, this balance will continue to be improved in terms of usability and will provide increased guidance for appropriate management practices. It is one of the tools being developed within the SVS programme for improved sustainable management of N fertiliser.

For any queries on the use of this N balance please contact Andrew Barber (**andrew@agrilink.co.nz**) or Bruce Searle (**Bruce.Searle@plantandfood.co.nz**).

CARBON FARMING INTRICACIES

opinion

Robin Boom : CPAg, Member of the Institute of Professional Soil Scientists

Keith Woodford, honorary Professor of Agri-Food Systems at Lincoln University, has recently written a number of articles comparing the economic returns of planting pine trees on farmland for carbon farming to various livestock farming enterprises.

The projected figures show that carbon farming is far more lucrative than the current high returns from sheep and beef and that it is also more lucrative to plant a lot of recently converted dairy farms even at a $9/kg Milk Solids payout, into pine trees, and only intensive dairy farms and horticulture will be able to compete economically with carbon farming. In two short years the New Zealand Emissions Trading Scheme carbon unit price has more than tripled from $25 to $80 with projections it will shortly exceed $100 per unit.

Recent publicity about Huiarua Station on the East Coast, an iconic 5000ha property inland of Tolaga Bay, being sold to go into trees for carbon farming has got politicians looking for solutions to the wholesale afforestation of pastoral land. Huiarua Station had been put up for tender in December last year and although there were good offers by livestock farmers, the deep pockets of overseas investors who understand the artificially created opportunity of carbon farming were the deepest.

Planting land into *Pinus radiata*, leaving them to absorb CO_2 out of the atmosphere for 30 years is easy money with few ongoing expenses. Huiarua Station has huge tracts of cropable and easy rolling country, and for this land to be lost forever, when there will be no net benefit for the local community, seems a tragic loss. When it comes to global climate change, there will be no gain worldwide, as the meat and wool not grown on Huiarua Station will be grown instead in some other country, where the carbon footprint is likely to be considerably higher.

New Zealand is known to produce food which has a very low carbon footprint compared to most countries. We were a signatory to the 2015 Paris Agreement of the United Nations Framework Convention on Climate Change and have a duty to fulfil the demands in the Agreement.

One of the guiding principles in this agreement is *"Recognising the fundamental priority of safeguarding food security and ending hunger, and the particular vulnerabilities of food production systems to the adverse impacts of climate change."*

Article 2 (b) states the goal of *"Increasing the ability to adapt to the adverse impacts of climate change and foster climate resilience and low greenhouse gas emissions development, in a manner* ***that does not threaten food production****."* As a food producing nation which feeds the equivalent of 40 million people through our food exports it is imperative that any policy implemented on climate change does not affect our food producing ability. Unfortunately these clauses in the Paris Accord seem to be ignored by many of our current crop of politicians.

Almost half of our greenhouse gas emissions come from agriculture, largely from enteric methane produced in the rumen of sheep, cattle, goats and deer, but also from nitrous oxide from animal urine and fertiliser nitrogen. Arable and vegetable crop production also produces greenhouse gases from CO_2 lost through soil inversion, fallowing and plant desiccation, as well as nitrous oxide from artificial nitrogenous fertilisers. Soil carbon loss can in part be mitigated through the use of composts, manures and biochar, but there will still be CO_2 lost into the atmosphere during the cultivation process from microbial decomposition of organic matter, a process which humans have been contributing to for thousands of years since the dawn of agriculture.

Go-to tree

Pinus radiata is the go-to tree for carbon farming as it sequesters carbon rapidly due to its rapid growth, grows in a wide variety of conditions, gets close to maximum sequestration in 30 years, meaning the carbon farmer will get maximum payment over thirty years, whereas native forests, a preference for many Kiwis, can take up to 300 years to reach their carbon potential, and in the short term the economic returns are a pittance compared to pines. Pine trees are a monoculture and do not encourage biological diversity in terms of bird, insect, flora and microbial communities. How upland afforestation will affect intensive horticulture downstream with things such

as water quality, rainfall events, pollinators, bird and insect life; whether these will be better or worse than under pastoral agriculture is unknown.

Carbon trading and gaming with New Zealand Units (NZUs) in the Emissions Trading Scheme (ETS) through recent and upcoming auctions has been on an upward spiralling trajectory which looks to continue, and as it does, so too the local and international opportunists will convert farmed landscapes into trees. This has become an economic bonanza for retiring hill country farmers, but it is at the chagrin of their neighbours and rural communities as a whole, who see this loss of productive land to carbon sequestration as destructive to local infrastructure and job opportunities for future generations.

As an agronomist, I would like to see afforestation being limited to certain land classes based on Land Use Capability (LUC) categories. If afforestation was limited to LUCs of Class 6 soils and above, with more productive land categories remaining in agriculture or horticulture, when a property like Huiarua Station is sold, only the poorer producing areas should be allowed to be planted into trees, with the better country kept for food production of some sort.

> **“As a food producing nation which feeds the equivalent of 40 million people through our food exports it is imperative that any policy implemented on climate change does not affect our food producing ability**

Article 4/19 of the Paris Agreement states "*All Parties shall strive to formulate and communicate long-term low greenhouse gas emission strategies, mindful of Article 2 (above) taking into account their common but differentiated responsibilities and capabilities, in light of different national circumstances.*" Our national circumstances are that we are blessed with a temperate maritime climate which is ideal for food production. We have limited Class 1 and 2 soils suitable for intensive horticulture, but we have significant class 4, 5 and 6 soils on steeper land which cannot be ploughed, but which is highly suitable for pastoral livestock production to produce meat and natural fibres.

Article 7 of the Paris Agreement states that signatory countries will engage in adaptation planning processes which may include "*The assessment of climate change impacts and vulnerability, with a view to formulating nationally determined prioritized actions, taking into account vulnerable people, places and ecosystems" and "Building the resilience of socioeconomic and ecological systems including through economic diversification and sustainable management of natural resources*" (clauses 9c & 9e).

In New Zealand there are many small rural towns and vulnerable communities which will be severely impacted if there is a wholesale conversion of good productive pastoral farmland into trees. Apart from the initial labour required for planting trees, if the trees are planted as a carbon sink, there will be no income earning potential for these communities whatsoever. If the trees are planted for commercial forestry production, there will be little labour required until harvest, and no income generated off the land until some 25 to 30 years later, which again would be devastating for local communities in the meantime.

The very economic survival of most rural towns is dependent on providing support services for local farming families. Converting good productive farmland into trees will be the death knell for many of these communities, and is certainly not "*building the resilience of socioeconomic systems*" nor *"taking into account vulnerable people, places and ecosystems*" which Article 7 of the Paris Accord prescribes. Furthermore, when large national or international companies buy up good pastoral farms to plant into trees, they have no interest in the local communities. They do not live there, and often any tree work is contracted out to mobile forestry gangs from other regions. The money gained from timber sales never comes into the local communities as it goes to those foreign investors or Queen Street investors who have only purchased the land to 'carbon farm', and game this artificially created, politically driven, Emissions Trading Scheme (ETS).

Ironies

One of the ironies of the politics behind the ETS and carbon farming is that it is Left leaning politics which is promoting a cause that in reality is making a select few much wealthier and the vast majority poorer. It is a reverse Robin Hood scenario where money is taken from everyone via increased fuel taxes, energy, food, transport etc and given to the extremely wealthy who own these new forests, many of whom are overseas interests using our land to offset their own carbon emissions. It may look good for the New Zealand carbon balance in the short term to be sequestering carbon for the next 30 years through extensive pine afforestation, but as the Draft Report from the Climate Change Commission released last year stated, "*Forests have a role to play but we can't plant our way out of Climate Change.*"

Being amongst the most carbon efficient food producers in the world there is no net gain to the world climate, as the food will be produced elsewhere with a higher carbon footprint. Unfortunately once land is planted into pines, in pines it is likely to remain.

GLOBAL WARMING
RISKS AND OPPORTUNITIES

final word

Mike Nichols

Flooded Motueka River, 17 July 2021

It is predicted that climate change will result in a significant warming of the environment, but more importantly the development of extreme weather conditions.

This will mean that rainfall patterns in particular which can influence crops, will be seriously affected. This will apply worldwide and we are already seeing some of these weather phenomena, for example the extremely high temperatures this northern hemisphere summer in North America. And the drought and frosts recently in Brazil which will affect world coffee production (and therefore prices) for several years.

New Zealand is not immune to these extreme weather happenings, but with modern technology it should be possible to overcome, and even make use of them to improve our production systems.

Kiwifruit is currently the major horticultural export earner, and they are (as far as we are aware) very sensitive to environment. At one time it was considered that the crop could only be produced in a limited area near Te Puke, though this theory has now been completely debunked.

Nevertheless, adequate winter chill is an important component of productivity and with the pending departure of Hi-cane, this could pose major problems for kiwifruit producers in the top half of the North Island, unless a satisfactory alternative is developed.

Many of the other tree fruits also require significant winter chill to perform, particularly apricots, nectarines and peaches, and even apple buds will fail to break evenly in the spring if they are inadequately chilled.

> **“ New Zealand is not immune to these extreme weather happenings, but with modern technology it should be possible to overcome**

Some 30 years ago a group of senior New Zealand agricultural scientists predicted that a major effect of global warming for New Zealand would be that the West Coast of both islands would have higher rainfalls, while the East Coast would receive lower rainfalls.

This is going to pose a major problem for the horticultural industry in Hawke's Bay, Marlborough and Canterbury, where high productivity is very dependent on adequate irrigation capacity in the summer.

For example, the decision not to build the Ruataniwha Water Storage Scheme must have serious implications for the long-term viability and any expansion of the horticultural industry in Hawke's Bay.

The pecking order for fresh water is (and must always be) people, industry and finally agriculture. The population (and therefore demand for fresh water) is only likely to increase in the future, and this will make less water available for agriculture, and put serious constraints on any increases in both expansion and intensification.

> **Kiwifruit is currently the major horticultural export earner, and they are (as far as we are aware) very sensitive to environment**

Some 30 years ago or more, I consulted with a Food & Agriculture Organization (FAO) team in Quetta, Pakistan on a pipfruit project. In our final report we emphasised that Quetta had an expanding human population, that the rainfall was an inconsistent 250 mm/year, and that any future fruit tree plantings should be linked to the estimated water available for irrigation. Little notice was taken of the report and the result was a significant planting of apples, with the capital rich growers boring the deeper irrigation wells, while the capital poor growers watched their half-grown apple trees die due to water shortage. The precise opposite of the advice in our report. Yes, there is water under the Hawke's Bay plains, but taking too much of it will allow saline water to move into the aquifer from the sea.

Recent visits to Hawke's Bay have shown a huge change in the horticultural crops being grown. High density apples are replacing wine grapes, with the danger that irrigation water will in the future be a limited resource. In a dry year wine grapes will still produce – in fact the wine quality may even be enhanced in a drought – but for apples the lack of water could be traumatic in terms of both yield and quality.

Perhaps the solution is to change the manner in which we grow fruit trees. There is already a move to grow rain sensitive fruit (such as cherries) under high plastic-clad greenhouses and this may be a possible approach for apples, which after all are now grown at high density and barely three metres tall.

The greenhouses will also provide a means of trapping rain for storage for later irrigation, and the potential for growing fruit trees hydroponically is water efficient, and clearly the next step up in technology for the fruit industry.

The model is quite clear – 60 years ago virtually no greenhouse tomatoes were grown hydroponically, but now in all developed countries it is the exception to find them grown in greenhouses in the soil. More and more berryfruit are being grown in greenhouses hydroponically, and it is only a question of when (not if) the tree fruits will follow suit. Hydroponics offers not only water conservation but also the efficient use of nutrients (fertiliser) by using a recirculating system. It also offers potential yield increases, as the plants receive not only the optimum water they require to produce high yields, but also (critically) the optimum level of nutrition.

It must be noted that soil is NOT necessarily an ideal medium in which to grow plants, particularly high value crops. Many New Zealand soils are deficient in one or more of the critical minerals required to obtain optimum crop productivity, and hydroponics offers the opportunity to provide the crop with the optimum nutritional levels according to our current knowledge, without any concern for the underlying soil type. The poorest quality land (puggy clay or coarse sand) will have no influence on productivity with a hydroponic system.

> **It must be noted that soil is NOT necessarily an ideal medium in which to grow plants, particularly high value crops**

The potential of protected cultivation need not be restricted only to current horticultural production areas, as the West Coasts of both islands (particularly near the sea) have excellent sunshine levels, and using greenhouses as rain shelters, and hydroponics could well be a cheap and efficient way into intensive horticulture. Why pay thousands of dollars per hectare for land when with hydroponics any rubbishy old land can be just as productive?

Of course there will be exceptions, particularly for extensive field crops such as process vegetables, and some broad acre crops like potatoes and onions, however the move by LeaderBrand to grow fresh cut lettuce in a large greenhouse is perhaps a sign of the future.

PRODUCT GROUPS

ALL THE LATEST NEWS FROM YOUR PRODUCT GROUPS

COLLABORATIVE, GROWER-LED RESEARCH TO ADDRESS CHALLENGES

Gemma Carroll : Potatoes NZ Inc. communications & engagement officer

Tomato Potato Psyllid (TPP)

The Canterbury Potato Liberibacter Initiative (CPLI) was formed in August 2021 by like-minded Canterbury farmers and industry representatives to combat the devastating impact of the *Candidatus* Liberibacter solanacearum (Lso) bacterium causing 'zebra chip' in potato crops. Lso is transmitted by the Tomato Potato Psyllid (TPP).

The TPP incursion was first detected in Auckland in 2006 and quickly spread throughout the North Island and then the South Island to as far south as Invercargill, within five to six years.

Only three to five percent of TPP in a population will carry Lso; these psyllids are classed as 'hot psyllids.' Hot psyllids feed on the plant and infect it with Lso, causing zebra chip in the potato tubers. Zebra chip caused production issues only in the North Island processing plants until 2015, but from 2012 to 2015 Canterbury psyllid populations were increasing and causing quality issues for both growers and processors.

Since 2015 insecticide programmes have improved and increased year-on-year with weekly spraying of potato crops to reduce TPP populations. There have been other initiatives with varying levels of success over the years to reduce TPP populations.

Although the control measures and agronomy of Tomato Potato Psyllid (TPP) have made improvements, the incidence of zebra chip in the processing crop has only increased and detection levels in potato fields remains high.

CPLI believe the only way to tackle the TPP and Lso (zebra chip) issue in Canterbury, is a Canterbury initiative led by key industry stakeholders, with a purpose to either eradicate Lso and TPP or at the very least to reduce the incidence, so that zebra chip defects have a minimal

TPP affected foliage

impact on seed crops and the quality of the potato crop for both growers and processors. CPLI's goal is a less than 0.2 percent defect level in process potatoes.

Repeating the same chemical programmes over and over, year-on-year and expecting a different result is not solving or reducing the zebra chip impact for the growers, seed growers and processors. Therefore, a major rethink is needed to tackle this problem.

A formal co-investment is being led by Canterbury potato growers and industry, with a voluntary CPLI Levy contribution.

Potato affected by zebra chip

This voluntary Levy is collected through Potatoes NZ's BELIS (Biosecurity, Emissions & Levy Information System). It is deposited into the Potatoes NZ Charitable Trust bank account and classed as a donation, tax deductible to the donator.

There is a very positive response from growers and processors for this new initiative.

The CPLI working group has 18 representatives from seed and process growers, processing industry representatives, agronomy and potato service companies, Potatoes NZ personnel, Plant & Food Research (PFR), and Dr Clive Kaiser, Associate Professor of Plant Science, Field Research Centre at Lincoln University.

> **"There is a very positive response from growers and processors for this new initiative**

CPLI's size reflects the enthusiasm and level of urgency from within the Canterbury Potato industry to find solutions to the economic impacts that Liberibacter has on our industry and the need for a cost competitive solution.

CPLI meetings since August 2021 have uncovered a number of issues contributing to TPP and Liberibacter's financial impacts on Canterbury potato production, highlighting the importance of finding solutions and prioritising research projects to get up and running as soon as possible.

The CPLI strategy includes seven key projects, some underway and some to start over the next two years with an overall budget of $500,000.

CPLI PROGRAMME SUMMARY

1. **Screening of TPP for resistance to commonly used contact insecticides.** The aim of the project was to investigate whether selected contact insecticides at label rate were efficacious on a field-collected population of TPP from Canterbury. MAVRIK® AQUAFLO, Karate Zeon®, Pirimor® 50, Benevia®, Oberon®, Methafos 600, and Sparta™ were screened. The results showed no material difference in mortality of adults and nymphs between the 'wild' field-collected colony and the susceptible PFR TPP colony, for all products tested. Therefore, the perceived lack of control of TPP in Canterbury may have been due to other factors. Project completed and full report available on the PNZ website https://potatoesnz.co.nz/rd-project/canterbury-potato-liberibacter-initiative/
2. **Screening of TPP for resistance to commonly used systemic insecticides**. The project will investigate the field population against nine insecticides with systemic and/or translaminar properties at label rate. This would involve screening the insecticides against TPP collected from the field in March 2021 (and now in rearing) and the susceptible PFR lab colony as a control. The insecticides that have been requested for testing include Benevia®, Oberon®, Methafos 600, UpholdTM, TransformTM, AVID®, Chess® WG, Movento® 150 OD and Mainman®. Project underway and final report due May 2022.
3. **Screening of Systemic Acquired Resistance (SAR) products and antibiotics for efficacy on Liberibacter.** Test selected products/compounds for their activity on reducing zebra chip symptoms in potato tubers. The trial will be conducted in a shade house at PFR Lincoln, using potato tubers planted in pots. Lso-positive adult TPP from the PFR Lab colony will be used. Products tested include, KeyStreptoTM, Force Field, Actigard®, and Kendal®. Project underway and final report due.
4. **Fertilisation of potatoes with calcium propionate to prevent spread of Liberibacter** For this project potatoes will be fertigated with calcium propionate in greenhouse pots. Once the plant has taken up sufficient calcium propionate that it will be afforded protection against Liberibacter, it will be vectored by 'hot' TPP. Potato seed will be grown in pots in virgin soil obtained from fields in Canterbury, representative of those that will be growing potatoes. Plants will be treated with calcium propionate as a soil application. Some plants will be infected with TPP from either 'hot' or 'cold' colonies and compared against non-TPP treated plants. The effect of calcium propionate on the infection by Liberibacter will be determined in the leaves, stems and tubers. This project will be completed by a Masters student at Lincoln University.
5. **Use of lures to attract and kill TPP to prevent their entry into potato crops**. A range of products will be investigated for attractancy and repulsion of psyllids. These will include: agar, gums (e.g. guar, xantham etc.), gels, surfactants, encapsulants, dessicants, sterilants. Evaluation of these products using both 'hot' and 'cold' psyllids will be undertaken to ensure attraction to both. This project will be completed by a Masters student at Lincoln University.
6. **Use of biological control agents to manage TPP populations in both potato crops and in alternate or over-wintering hosts.** Identify and shortlist potential biocontrol agents based on scientific literature, specific life-traits and potential TPP consumption. Small-scale experiments will determine the actual performance of candidates on TPP-infested potato leaves and on African Boxthorn leaves, as well as possible control agent feeding preferences on one or more TPP life stages. Host-plant tolerance and preference will be determined and the extent to which selected biocontrol agents can survive and reproduce on potato and boxthorn plants. Releases of predators at boxthorn locations have taken place and further releases are planned following laboratory studies. This project will be completed by a Post-Doctorate researcher at Lincoln University.
7. **Use of selected border planting to attract beneficial insects and limit psyllid ingress into potato crops.** Ten commercial paddocks have had border crops planted adjacent to the potatoes. The impact of these borders will be assessed at the end of the season to determine if they have had a significant impact on Liberibacter infections. Results will be collated following the 2021–22 season and are expected by June 2022.

CPLI and PNZ will run an industry evening in the winter months to present these projects and their findings.

PNZ MOU SIGNED WITH LINCOLN UNIVERSITY

Gemma Carroll : Potatoes NZ Inc. communications & engagement officer

The board of Potatoes NZ Inc. (PNZ) has signed a memorandum of understanding (MOU) with Lincoln University to launch a research partnership which includes a Centre of Excellence for Potato Research and Extension, based in Canterbury.

Lincoln University Associate Professor of Plant Science, Clive Kaiser, will be the establishment Director for the Centre of Excellence for Potato Research and Extension. He says the new Centre will be extension-led and grower-centric. He believes it will be a game changer for the potato industry.

The fundamental tenet of the concept of 'extension' is to extend the knowledge gained through research, typically conducted by universities and research centres, to growers in the field.

"The research conducted at the Centre will be focused on working with potato growers to identify and understand the problems confronting them and to devise solutions to those problems. The solutions will be developed through discovering new knowledge, as well as by using existing knowledge in new ways, and will be underpinned by strong local, national and international collaborations. This co-operative, collaborative research approach will have immediate, significant and long-lasting benefits for New Zealand growers," Clive says.

Prior to joining Lincoln University, Clive Kaiser was Interim Director of the Hermiston Agricultural and Research Extension Center (HAREC) – a world-renowned research centre for potatoes – based at Oregon State University. He and PNZ share a vision to establish a similar research capability at Lincoln, where the Centre's researchers and collaborating partners will contribute to an open, collaborative network of New Zealand and international researchers focused on ensuring the growth and success of the New Zealand potato industry.

MOU 'signed'

"Like HAREC, the Lincoln-based Centre of Excellence will be a grower-centric knowledge, expertise and research hub designed to support the potato industry and growers to address their grand challenges, as well as to help them identify market growth opportunities and successfully commercialise those opportunities."

"At present HAREC is the go-to global hub where potato growers from New Zealand and all over the world go for advice, education, problem-solving and inspiration. Now New Zealand growers and other potato industry participants will be able to find that support and practical assistance at the new Centre at Lincoln University," Clive says.

The chief executive of PNZ Chris Claridge says "Solving grower and industry problems is our key purpose, this partnership will enable us to do so more effectively."

The New Zealand potato industry is valued at over $1 billion per annum, with 175 growers across the country and multiple frozen chip and crisp processors.

Stuart Wright, the chair of PNZ's board says, "We're very excited to be involved with Lincoln University, especially with their track record in agricultural research and education."

As a specialist land-based university, Te Whare Wānaka o Aoraki Lincoln University continues to play an important role in shaping a more productive and sustainable future for Aotearoa New Zealand.

Vice-Chancellor Professor Grant Edwards says, "In signing this MOU and partnering with PNZ to establish a Centre of Excellence in Potato Research and Extension based at our Lincoln campus, we will be contributing the University's considerable expertise and resources to support the potato industry to drive future success and address its major challenges.

Lincoln University is committed to building collaborative partnerships with industry and research providers to achieve innovative and sustainable solutions to some of the world's most pressing land-based challenges, and this determination aligns completely with PNZ's ambition to build a secure and sustainable future for Aotearoa's potato growing industry."

TomatoesNZ

FTEK AUTOMATION PROJECT UPDATE

Dinah Cohen : TomatoesNZ business manager

A sneak peek of FTEK's tomato crop task attachment, scheduled for pilot field trials later this year

FTEK is nearing completion of the first stage of research and development in a three-stage labour saving automation programme, backed by growers and industry groups within the New Zealand greenhouse industry. The company plans to showcase the working prototype of what they now refer to as a "robotic labour assist platform (RLAP)" at the 18 May TomatoesNZ (TNZ) workshop in Pukekohe.

The robotic platform combines clever hardware and software with a key focus on modular tasking capability.

Biosecurity update

You might have noticed that we have updated the biosecurity posters on our website.

Please circulate these among your employees so they can refer to them. They can be found under 'Biosecurity' and 'Exotic Pest Fact Sheets' on the TNZ website.

www.tomatoesnz.co.nz/biosecurity/exotic-pests-fact-sheets-2/

PepMV Testing kits

You will soon receive a free testing kit with everything you need to send samples to a lab of the tomato plants you will be removing at the end of the growing season, to test for the presence of pepino mosaic virus.

As you're aware, PepMV has been detected in a small number of plants over the past 14 months. The testing of samples from all tomato growers will help us confirm whether the virus has or has not spread beyond the few growers that we are already aware of.

This testing should play a significant assurance role in the export markets that haven't already reopened, most importantly Australia. Please send in your samples and if you have any questions, please don't hesitate to email Dinah.cohen@hortnz.co.nz

> "The robotic platform combines clever hardware and software with a key focus on modular tasking capability

Biopesticides

A Lighter Touch, in which TNZ is a programme participant, has produced a grower resource on the management of biopesticides by growers. If you would like a copy of this, please email Dinah.cohen@hortnz.co.nz.

As the name suggests, biopesticides derive from naturally occurring compounds and are best used in an integrated pest management (IPM) approach, alongside synthetic agrichemicals.

Some of the main benefits of using an IPM is that biopesticides are:

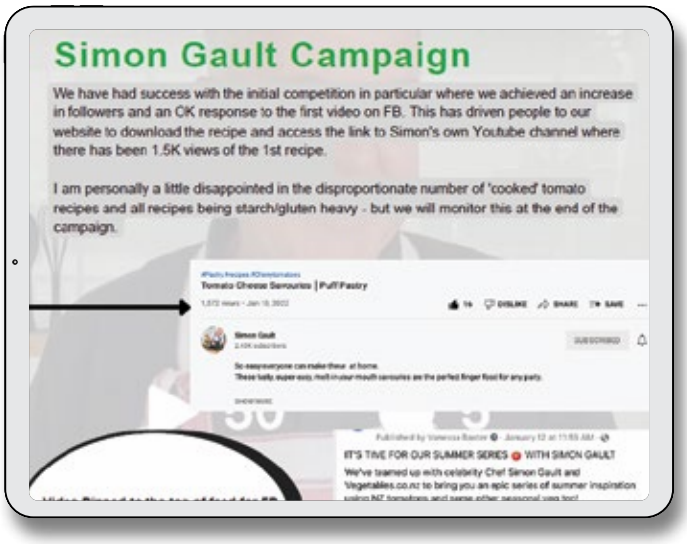
- Less likely to build resistance
- Contribute to an environmentally responsible production system
- There are fewer restrictions on their use e.g. timing with harvest due to compliance with residue limits.

Making sure that you ask the right questions before purchasing is key.

You need to know that you are buying a registered product, when, how and why to use it, as well as what other bio- or agrichemical products it is compatible with.

Sleeper pest research paper

Manaaki Whenua – Landcare Research has published a paper by Dr Geoff Kaine on engagement strategies and managing sleeper pests. Email Dinah.cohen@hortnz.co.nz if you would like a copy.



Summer promotions review

Over the summer period, we had three different partnerships running campaigns to promote all things tomatoes! If you haven't already seen these promotions, please check out, like and share The Tomato Source (Facebook, Instagram and a dedicated website), Simon Gault's videos and 5+A Day.

https://tomato-source.co.nz/

www.youtube.com/watch?v=8YD4cmeBR0U (or search on YouTube for Simon Gault)

www.5aday.co.nz/recipes/mediterranean-tomato-salad/ (or search 'tomatoes' for lots more recipe ideas)

18 May grower workshop, Pukekohe

We are finalising details for our next grower workshop in May, which will provide the chance to hear updates from some of our key project leads. At the moment we are planning for an in-person workshop in Pukekohe, which is open to all TNZ members to attend in person or online. Topics include PepMV, FTEK update and energy.

A list of confirmed speakers and timetable for the day will be emailed to all members.

> **We are finalising details for our next grower workshop in May, which will provide the chance to hear updates from some of our key project leads**

TomatoesNZ board nominations

The TomatoesNZ Annual General Meeting will be held in August and will include elections for board members. This year, two grower elected members will retire by rotation:

- Simon Watson is offering himself for re-election.
- Mayank (Mike) Saklani is offering himself for re-election.

We also have one opening on our board that is not currently filled. Nominations are now being sought from individual grower members and affiliated grower associations for these three vacancies. Candidates must be nominated by at least two grower members or affiliated organisations.

Nominations close at 5pm, Thursday 9 June. Please email **Dinah.cohen@hortnz.co.nz** for a nomination form.

FUTURE DIRECTOR INTERNSHIP

Antony Heywood : Vegetables New Zealand Inc. general manager

Karn Dhaliwal was the first person considered for the Future Director Internship in 2021

Vegetables New Zealand Inc (VNZI) is seeking a Future Director to serve and gain experience on its Board. The year-long appointment – to start in September 2022 – will allow the successful appointee to gain experience in governance, leadership and strategy.

This position will suit an applicant who has active involvement in a horticultural enterprise. There is an expectation that the applicant will understand the issues and challenges that horticulture and growers face.

This is a great development opportunity for a future leader with a genuine interest in governance. The Future Director will have the opportunity to be mentored by an industry leader. In making the selection, VNZI's diversity policy will be taken into account.

The role will entail up to 10 hours per Board meeting. This will cover preparation for the coming meeting, attending a prior Crop Advisory Group (CAG) meeting, and then attendance at the Board meeting. There are five VNZI Board meetings per year. The VNZI conference and Annual General Meeting (AGM) will involve two days, mid-year. The Future Director will be encouraged to use this time wisely, network with growers and participate in the forums, including the AGM.

The role description can be found at: https://www.freshvegetables.co.nz/

If you are interested in this role, please send your CV and a covering letter to: **Lynda.banks@hortnz.co.nz**

Applications open on Monday 11 April 2022 and will close at 5pm, Monday 13 June 2022. The successful candidate will receive induction in September 2022, and attend a VNZI Board meeting mid-September 2022 (subject to Board schedule).

> **"This is a great development opportunity for a future leader with a genuine interest in governance**

Karn Dhaliwal was identified by VNZI as an initial recipient of a Future Director Internship prior to the placement becoming official. Karn came to the attention of VNZI while attending the Horticulture Leadership programme in 2020 and was asked to join the Crop Advisory Group (CAG). He subsequently attended the 2021 Horticulture Conference and a Board meeting as an observer to get an understanding of governance within the vegetable industry. VNZI sees Karn as an industry leader and looks forward to supporting his future direction in the vegetable industry.

SEASON UPDATE

James Kuperus : Onions NZ Inc. chief executive

The 2022 season has not been without its challenges for the New Zealand onion industry. The culmination of a lack of rainfall, high disease pressure, increased cost of inputs, shipping disruptions, lack of labour, the Covid-19 pandemic and an emerging war in Europe is really testing the resilience of the sector. But such is the nature of growing onions and exporting from the bottom of the world to more than 40 overseas markets.

We are connected into and reliant on seasonal weather fluctuations as well as macroeconomic shifts and government decisions. Our silver lining is that we have strong demand in Asian markets, and it may possibly not be a bad year to have a reduced crop with some of these disruptions.

As a sector and community, we need to remain mindful of what we can and cannot control. We cannot control global pandemics or wars. What we can control is the quality and price of what we sell and market. As we are challenged by a difficult season like this, it is important for the sector to maintain standards, and to set pricing which reflects the increased costs and disruptions.

What can be done by the government to relieve pressure?

Market Access. Market Access. Market Access.

The onion sector needs world leading market access to be able to match supply with demand. There are markets that prefer smaller onion bulbs, but we need to be able to export to them. Current limitations around market access are significantly holding back the New Zealand onion industry.

At the time of writing, we do not have access to key markets such as Thailand, the Philippines, China and South Korea. We also have trade prohibitive measures to contend with such as the Indonesian sizing ban, the European Union tariff, fumigation requirements and changing food safety requirements, along with countless other nuances designed to restrict the growth of trade.

The New Zealand government has plenty of strategies and ideologies around increasing exports, particularly high value horticulture. Increased onion exports meet all of the government's objectives including regional development, reduced greenhouse gas emissions, diversified exports and increased exports.

> **"We cannot control global pandemics or wars – what we can control is the quality and price of what we sell and market**

But yet we find market access for horticultural products is not prioritised at a senior level. Current trade policy is centred around what will deliver the best return for investment. Nine times out of ten, it will be milk powder. When push comes to shove, we need government ministers to prioritise market access for horticultural products, including onions.

If ministers want increased horticultural exports, reduced greenhouse gasses, a diversified export programme and regional development, they need to defend and improve market access at the most senior level. We can set up the New Zealand onion industry for a brighter future, but we need to have the government's support for market access.

At Seed and Field Services we know our onions.

Seminis Early Pukekohe Longkeeper (ELK) and Regular Pukekohe Longkeeper (PLK) seed is available now for the 2022 planting season.

At Seed Enhancements we also know how to get the best out of every onion seed planted, with over 20,000 onion seed lots coated over 25 years.

SEED & FIELD SERVICES LTD

Contact us at +64 9 237 1153
or www.seedandfield.co.nz

ELLEPOT: 'STATE OF THE ART' HYDROPONIC PROPAGATION SYSTEM

Parsley grown hydroponically, in a degradable Ellepot

Ellepot, the developer of reliable and certified integrated propagation systems, is winning favour in nations at the forefront of innovation, sustainability, and technological advancement.

Danish company Ellepot has provided a high-quality paper pot system for nearly three decades, bringing customised solutions to the horticultural industry globally. In recent years, the advancement of hydroponic farming has been accelerating, and Ellepot has gained traction among both existing and newly constructed hydroponic farms across the Northern Hemisphere, supplying customised Ellepot systems in Iceland, Holland, Finland, Sweden, Norway, Lithuania and the United States. Ellepot systems for hydroponics are also in operation in Malaysia, the Philippines, South Korea and Singapore with the first hydroponic-specific system to be installed in Australia in August 2022.

Strong roots and fast growth (with no net pots)

The specially developed degradable Ellepot paper stabilises your growing media and allows the roots to penetrate from all sides of the Ellepot. Along with ample access to water and nutrients, growers who use Ellepots for hydroponics are experiencing stronger and faster root growth, which stabilises the plug as the degradable paper pot slowly disintegrates.

Production and plastic savings

In addition to using degradable paper and strong root systems to stabilise your growing media, another significant benefit to using Ellepots is the elimination of the plastic net pot and subsequent post-harvest waste. Many retailers are looking to cut back on plastics to achieve an improved environmental footprint. In Finland, for instance, supermarket giant LIDL only stocks Ellepot grown herbs.

Growing media flexibility

Using the Ellepot System allows growers to use the substrate of their choice, increasing operational flexibility. Growers are not limited to a single substrate type, and can choose the best substrate mix for their growing system and use locally sourced soil-less substrates to further reduce their environmental footprint. Using Ellepots also offers other benefits, such as the ability to supply organic crops when using the Ellepot Organic 2.0 paper.

Fresh pots at hand

Having your own Ellepot machine and on-site production enables you to produce fresh pots as and when needed, without having to rely on specific delivery or order schedules for imported pre-made pots.

Automation increases financial sustainability

Machine automation is hugely beneficial where labour is either very expensive, less available, or could be more efficiently utilised elsewhere. With the Ellepot System, automation helps the producer achieve a reliable production set-up where costs are controlled, keeping prices down.

The Ellepot System for hydroponic propagation allows growers to reduce reliance on plastic net pots, achieve multiple production savings and improve waste handling and logistics, all while growing an improved product.

To find out how the Ellepot paper pot system could benefit your business, get in contact with Ellepot's New Zealand partner Nathan Hewson from Advanced Hort at **Nathan.Hewson@advancedhort.co.nz** or Darran Stone from Ellepot at **dst@ellepot.dk.**

Visit **www.ellepot.dk** for more information.

TRS TYRE AND WHEEL INDENT OFFER

TRS conducting a tyre optimisation in Canterbury

Trelleborg's Progressive Traction technology is available with indent

TRS Tyre and Wheel has now opened the 2022 Trelleborg indent offer for New Zealand farmers.

Considerable savings can be made on agricultural tyres by placing an indent order with TRS before the end of May for delivery in spring. There is no minimum order requirement and by pre-ordering farmers have the security of knowing their tyres for spring are on the way, but no payment is required until they arrive. Orders are delivered via local tyre retailers so fitting and any follow-up service can be easily arranged.

"The indent offer targets rural contractors and large-scale farmers who can gain the most benefit from pre-planning their spring tyre purchase" said Ivan Burrows, Trelleborg brand manager. "The indent offer allows farmers to better plan cashflow and make worthwhile savings at the same time."

TRS also offers a tyre optimisation service for all tractors running on either Trelleborg or Mitas tyres, which is free with any indent orders. The tyre optimisation service is designed to determine the right balance between inflation pressures and load, allowing the operator to get the most out of their tyres, whilst increasing tractor productivity and output. A visit can be as short as 30 minutes to get the tractor back out working as quickly as possible.

During the visit the tractor is weighed on both axles to understand the weight distribution on the tyres. Using the Trelleborg load calculator (TLC) app, optimum tyre pressure can be calculated for the specific machine configuration and model of tyre being used. The TLC App, launched in 2011, was the industry's first load and pressure calculator and works with over 5,000 potential machine configurations.

With new tyre and tractor technology, previous assumptions on tyre inflation pressures are often outdated. Not only does inflation determine the amount of load a tyre can carry, but it also impacts ride comfort, fuel consumption, tyre life and overall tractor performance. Adopting the right pressure can reduce running costs by over 20 percent.

TRS Tyre & Wheel, New Zealand's largest importer and distributor of agricultural and industrial tyres and wheels, was purchased by Trelleborg AB in July 2018 and has evolved from a tyre and wheel distributor to a manufacturer. With the change has come access to the considerable resources and expertise of Trelleborg Wheel Systems.

Growers can register their interest obligation free at **www.trstyreandwheel.co.nz/indent** or call TRS directly for a free no obligation quote on **0800 336 334**.

TRELLEBORG

THE BENEFITS OF BUMBLE BEES

Cooler autumn temperatures, low light levels or rain can reduce pollinator activity. Bumble bees have many advantages when it comes to pollination of both indoor and outdoor crops over a wider period of the year and under most weather conditions.

Efficient pollination is important in some crops to produce fruit set, whilst others will benefit greatly in improved yield and quality from supplemental insect mediated pollination. Cucurbits, squash, melon, blueberries and some berryfruit depend on pollinators. Greenhouse crops such as cucumber and tomatoes in particular show benefits from bumble bee pollination.

Bumble bees are in a league of their own as pollinators. They are happy to operate at lower temperatures than other bee species, down to 8 degrees Celsius, and undeterred by wind, rain showers or overcast conditions. Bumble bees have a highly efficient system of pollination, utilising their wing muscles to vibrate the pollen off the anthers of a flower and cover the bee for transportation to the next plant ('buzz pollination').

Bumble bees are a busy species, visiting more flowers per hour and producing a higher ratio of class 1 fruit than other pollinators. Yet they are 'home bodies' preferring to stay within a 100–200 metre radius of the hive, which means better targeting of your pollinator activity to the desired crop.

Covered crop settings, tunnel houses or under netting can be difficult to pollinate. Bumble bees are not 'claustrophobic,' happily working in confined spaces. Their non-aggressive nature also means better worker safety around the bees. Zonda's unique 'Beehome' hives are easily closed up or moved should there be a need to apply crop protection agents.

Varroa mite has decimated many honeybee populations and these losses can be expensive. The bumble bee can be a cost-effective and efficient pollinator option for many crops, extending pollination activity into the cooler shoulder seasons of the year.

Zonda provides self-contained hives containing hundreds of worker bees plus a queen and is happy to provide post-purchase assistance and advice to achieve the desired pollination results for the crop.

Contact Zonda on 0800 496 632
or email **zondasales@nzg.co.nz**

For more information on bumble bees as pollinators visit **www.zonda.net.nz.**

Classified advert rates

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Quarter Page	$435	$420	$395	$355
Eighth Page	$245	$235	$225	$205
Cameo (W40 x H65mm)	$145	$140	$135	$125

Custom $40 per column cm

To book a classified advertisement in our next issue contact:
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Email: dpascoe@xtra.co.nz

ELLEPOT®
GROW SMARTER

Ellepot partner in New Zealand

Ellepot partners with Advanced Hort

ONE INTEGRATED SYSTEM - ALL THE BENEFITS

We are excited to announce that we have partnered with Advanced Hort for the sales, service and distribution of our Ellepot system in New Zealand.

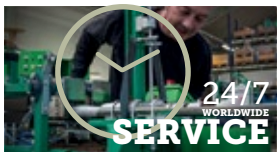
We believe that the partnership with Nathan Hewson and his team at Advanced Hort will ensure we exceed the high level of service delivery our Ellepot clients have come to expect.
Together with our Ellepot machines, customised trays and papers, you can produce Ellepots on-site and add value throughout your entire production chain, now with Advanced Hort with you every step of the way. Advanced Hort will be able to design an integrated Ellepot system customised to your specific production needs and provide on-site installation, training, and service back-up, as well as a local supply of Ellepot papers and spare parts.

Get in contact today with Advanced Hort and see how the Ellepot system can revolutionise your business.

ELLEPOT **MACHINES**

ELLEPOT **PAPER**

ELLEPOT **TRAYS**



ELLEPOT **SERVICE**

Advanced Hort
Your solution for growth

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