NZGROWER®

VOL 76 | NO 09 | NOVEMBER 2021 HORTICULTURE NEW ZEALAND

# CELEBRATING PRODUCE 'MISFITS'

PAGE 36

IN THIS ISSUE

# SPECIALISED MACHINERY AND GROWING EXPERTISE FROM THE GROUND UP



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# CONTENTS

## UP FRONT



## YOUR LEVY AT WORK



## YOUR INDUSTRY



## TECHNICAL



## PRODUCT GROUPS







**ON THE COVER:**

A Taupō produce box business is reducing food waste by finding a place for 'misfit' fruit and vegetables in the market. See page 36. Cover photo; Sofia Dekovic.

## WHAT'S NEW

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

# CHANGE CAN BE HARD

Words by Barry O'Neil : HortNZ president

**I have empathy for the farmers and growers who "howled" in protests up and down the country in August. These farmers and growers are organising to protest again in November, bringing public attention to the very real challenges the rural sector faces around climate change, freshwater, land use and the shortage of labour. It is easy to understand that to most, it all seems too much and too soon.**

Some protestors have called for a blanket stop on all the reforms, but I would prefer to hear discussion and debate about what would be better approaches than what is proposed. I would like to think that most would agree that climate change requires us to rethink how we grow and farm, or restore river water quality, for example; and that the Resource Management Act (RMA) requires reform as the current one is not working. I do not at all believe the New Zealand public is blaming farmers and growers for what the whole country needs to address. It is more a case that there is greater awareness than ever before of what is happening to the environment and the responsibility we all have to act.

Obviously, this government – with such a strong mandate within a three-year political cycle – is going to do what it was elected to do, based on its openly stated policies. And like it or not, this is democracy at work.

**So, what do our consumers want us to do?**

One area I always try and reflect on when change is proposed is what consumers would want us to be doing – the people who consciously choose and pay for our fruit and vegetables.

The beliefs and values of these consumers have changed and will continue to do so as the younger generations become the majority group purchasing. Unfortunately, their understanding of growing is not always good. There is the ongoing challenge for the horticulture sector to take consumers with us on our journey and show them what we have done, and what growing in the future will involve. In turn, this will hopefully help them understand why we are asking them to pay a fair price for our produce.

> "There is greater awareness than ever before of what is happening to the environment and the responsibility we all have to act

One thing that is clear to me is the increasing consumer demand for healthy, great tasting food, produced in a more sustainable way – which will return our rivers to a healthier state and manage the impacts of climate change for future generations.

Consumers are also seeking assurances that our sector is operating with good social practice.

With the world seemingly either burning with wildfires or experiencing extreme weather events such as flooding and hurricanes, you can see why the public are so concerned.

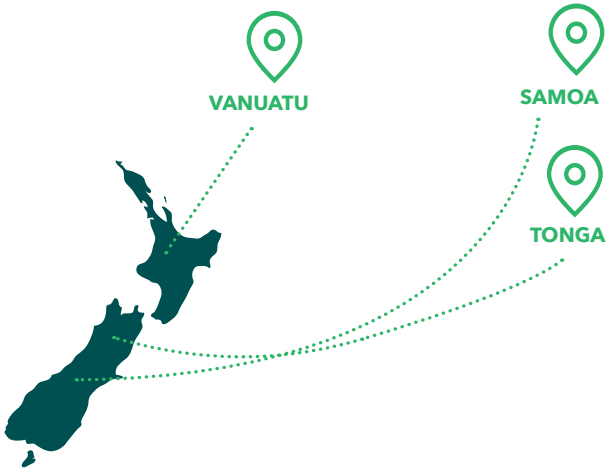
> "HortNZ's vision is "Healthy food for all, forever" and our purpose is to "Create an enduring environment where growers thrive"

Some growers are calling for HortNZ to be more aggressive and vocal in criticising the government over the policies being implemented.

I have seen other organisations do this at their own peril, ending up with doors closed on them. They have no opportunity to sit around a table and engage with key officials and Ministers, ultimately resulting in poor outcomes for their members.

When I think about this government's understanding of horticulture, I think about the policy changes being made to support vegetable growing especially in Pukekohe and the Horowhenua. The Recognised Seasonal Employer (RSE) scheme for example, allowing workers from the Pacific to work in New Zealand without

## POLICY CHANGES BEING MADE TO SUPPORT VEGETABLE GROWING




**The Recognised Seasonal Employer (RSE) scheme allows workers from Vanuatu, Samoa and Tonga to travel to New Zealand for work without the need for Managed Isolation and Quarantine (MIQ)**


**The Climate Change Commission's report actively promotes horticulture as a more sustainable farming solution**

the need for Managed Isolation & Quarantine (MIQ), and the Climate Change Commission's report actively promoting horticulture as a more sustainable farming solution. In other words, I see a government that is wanting to support horticulture, within the policy settings it is rolling out.

When I look at all the changes being proposed, horticulture is best placed of all the primary sectors to achieve these changes – changes our consumers are wanting to see. That's not saying the process will be easy, but I don't see we have an option if we want a prosperous future.

HortNZ's vision is "Healthy food for all, forever" and our purpose is to "Create an enduring environment where growers thrive." We will do everything we can in a way that best influences the change agenda to achieve these outcomes so that growers' businesses succeed, and so that local and international consumers will consciously buy increasing amounts of great New Zealand-grown fruit and vegetables.

Kia kaha. ●

NZGROWER

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Your Levy AT WORK

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# GROWING OUT OF ADVERSITY

Words by Nadine Tunley : HortNZ chief executive

**Like a lot of people, I am finding it hard to believe it is November already. Since August, New Zealand has been grappling with lockdowns and alert levels, as the government has moved from an elimination strategy to a management one because of the highly infectious nature of the Delta Covid-19 variant.**

We can once again be proud of our industry. As 'essential' workers, we continued to grow fruit and vegetables during the lockdowns while safeguarding the health of every employee and member of the public. Which is not to say this has been easy. Announcements by the government have often been confusing, and it has taken days to gain necessary clarity. This is disappointing, when all the growers and other industry participants want to do is the right thing, including making it easy for as many people in the workforce to get vaccinated.

> "What businesses need now is clarity so that they have confidence to make decisions that will affect the New Zealand economy for the next 10 years

Vegetable growers in Pukekohe have been the most affected. However, they have been well represented by the Pukekohe Vegetable Growers Association, in particular by Kylie Faulkner as President. Kylie has worked with HortNZ, Vegetables NZ and Onions NZ. In turn, we have all worked with the Ministry for Primary Industries to try and make sure the importance of a reliable supply of fresh produce is reflected in government decision making.

That advocacy is ongoing and given the government's change in Covid strategy, has been stepped up. Like most of New Zealand's industry and business, we have been frustrated by the government's slowness to provide clarity and guidance around vaccination and testing in the workplace, but more significantly, how the government intends to manage community outbreaks of Covid-19 in the future. Because businesses will not survive going from lockdown to lockdown, even with government support.

What businesses need now is clarity so that they have confidence to make decisions that will affect the New Zealand economy for the next 10 years. While current economic indicators are positive, we only need to look overseas at Britain to see what might happen if we do not make moves now to manage what we can control, with decisive leadership and planning.

### Staying the distance

Late last month, we held the Young Grower of the Year final in Lower Hutt. The event was affected by Covid – the Pukekohe finalist could not attend in person. However, we decided it was important for this celebration of up-and-coming Young Growers to go ahead, given last year's event was cancelled due to Covid.

This year's regional finals were oversubscribed, which illustrates our sector's underlying optimism and the fortitude within our industry. While there will be many challenges moving forward, our industry remains strong and determined to succeed. We have a track record of innovation and adapting to change to meet new demands and take advantage of new opportunities.

Demand for fresh, healthy fruit and vegetables has never been higher. This is a great opportunity for our industry as everybody has to eat, and I think it is that basic need that will compel the world to find solutions to issues around supply chain challenges.

As vaccination rates meet targets, people can travel overseas again, and we understand and accept what we need to do to live with the impact of Covid-19, from a personal as well as a business point of view.

Today's talented and committed young growers are the leaders of tomorrow. Despite the challenges ahead, I am confident the industry will return to fine health, offering rewarding career prospects to everyone who wants to be involved in providing New Zealand and the world with great tasting, fresh and healthy fruit and vegetables. ●


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# YOUR LEVY AT WORK

INDUSTRY WIDE ISSUES FOR INDUSTRY GOOD

# NATURAL RESOURCES AND ENVIRONMENT

Words by Michelle Sands : HortNZ environment manager

### Northland Agrichemical Decision

The Environment Court has provided a final decision on the agrichemical rules in the Northland region in the Proposed Regional Plan for Northland.

In the Proposed Plan the case related to the provision, which HortNZ appealed, did not allow application of agrichemicals (via ground-based or aerial application methods) when a spray-sensitive area was within 100m unless the wind direction was away from that area.

The decision of the Court, in summary:

- More detail about the requirement for a risk assessment.
- Included provisions that limit spraying in high wind (> 6m/s) and low wind inversion conditions.
- Inserts a more nuanced, risk-based framework – depending on wind speed, direction, effective shelter – in relation to spray-sensitive areas and requiring buffer distances (aligning with NZS 8409 e.g. up to 30m for ground-based methods) in some circumstances.

HortNZ will be communicating on the new requirements with growers.

### 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 an exceptional cultural, spiritual, recreational, natural character, landscape, geological, or ecological value which is remarkable in Hawke's Bay.

The Proposed Plan Change 7 aims to protect these outstanding features, in their current state, now and for future generations. The decision on the Plan Change was appealed, and HortNZ has joined the appeal as a 274 party and will participate in mediation.

Appellants have sought that the Heretaunga and Ruataniwha Aquifers be recognised as outstanding. HortNZ supports the decision which found these water bodies did not meet the criteria.

> **"The review panel concluded that, in its current form, it would not have confidence in Overseer's estimates of total nitrogen lost from farms**

### Overseer Review

Overseer has undergone a rigorous technical review following recommendations by the Parliamentary Commissioner for the Environment (PCE) in the report Overseer and regulatory oversight: *Models, uncertainty and cleaning up our waterways*, 12 December 2018.

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The review panel concluded that, in its current form, it would not have confidence in Overseer's estimates of total nitrogen lost from farms. They identified a general concern with the model structure as well as some specific areas of concern.

Overseer has been a fundamental tool underpinning the planning regimes in a number of regions and the way in which the regulators will respond to the Overseer review is not yet clear. The Decision for Plan Change 7 in Canterbury has been delayed, as have the mediations in Plan Change 1 in the Waikato and Plan Change 2 in the Manawatu/Whanganui Region.

In Tukituki Plan Change 6, Council have determined that they will be unable to reliably assess whether individual high leachers are exceeding their Land Use Capability (LUC) nitrogen (N) allowance in the Plan without the use of Overseer. Council will still require applications for properties located within sub-catchments which are exceeding their DIN (dissolved inorganic nitrogen) target. These farms require consent regardless of their Overseer estimated N loss. However, Council will not be able to determine the 'activity class', which is based upon the amount of N leaching modelled in an Overseer nutrient budget, as currently required by the rules in the plan.

**Emissions Reduction Plan**

New Zealand's first Emissions Reduction Plan sets out the actions we as a nation will take to meet the first emissions budget under the Climate Change Response Act. The plan also aims to set the country on the path to meet our second and third budgets, and transition to a low-emissions future in a way that is achievable and affordable.

Submission on the Emissions Reduction Plan close on 24 November 2021. HortNZ will develop a submission on behalf of all growers. HortNZ's submission will promote:

- Investment and strategy to enable transition for greenhouses, so we can continue to grow these crops in New Zealand.
- He Waka Eke Noa partnership's work in developing settings to drive lower emissions food production in New Zealand.
- Policies that support expansion of horticulture which produces healthy, low emissions food.

# ON-FARM BIOSECURITY SERIES: VEHICLES AND MACHINERY

Words by Anna Rathé : HortNZ biosecurity manager

**Vehicles and machinery that enter a site, whether for private or business use, can inadvertently spread weeds, pests or pathogens from one place to another.**

This is particularly true of vehicles or machines that travel directly from farm to farm. Long distance travel between regions or many site visits in a short space of time can increase the chance of vehicles and machinery inadvertently spreading a biosecurity risk organism.

Vehicles and machinery have many nooks and crannies where plant debris or soil may be lodged. It is important to make sure that all vehicles and machinery that visit your property are clean to minimise any biosecurity risk. Protocols for vehicles and machinery should be included in your on-farm biosecurity plan. Contact your industry body to see if they have a crop-specific template that you can use. If not, you can use the HortNZ template available online.

Some of the common risk areas associated with vehicles and machinery are explored below, along with risk reduction actions for you to consider.

### Entry of Vehicles and Machinery

Controlling entry points and site access reduces the risk that vehicles and machinery pose to your property by limiting where they go and allowing all movements onto the property to be recorded in a visitor register. One entry and exit point is best, with biosecurity signs on display that have clear instructions, including contact details. If feasible, try to ensure any access roads and parking areas are a distance away from crops to keep the risk item (vehicle) away from what is at risk (the crops). Whenever possible, avoid visitor vehicles travelling through or near production areas.

### Vehicle and Machinery Hygiene Practices

Thorough cleaning is necessary to remove visible contaminants such as soil, seeds and insects, but also to reduce the likelihood of inadvertently transporting pathogens that can't be seen with the naked eye. Clean and disinfect all borrowed or previously used machinery before using it on your property. If shared or contracted machinery is coming on-site, ask when and where it was last used and cleaned. If in doubt, consider re-cleaning it before allowing its use in the crops.

A good practice is to establish a wash down area to clean vehicles and machinery that need to enter the property. Ideally, all vehicles and machinery should be washed down, but especially those that are higher risk because they have visited other horticultural sites or are visibly dirty. The wash down area should be:

- Vehicle accessible
- Away from crops, paddocks and waterways
- Equipped with a high-pressure hose and bins for disposal of any cleaning gear
- Situated on a non-porous material (e.g., a concrete pad) with wastewater channelled away from crops and waterways, or preferably collected in a sump
- Regularly checked for new pests, diseases or weeds, especially areas around the wash down facility and next to access roads and tracks.

Ideally, vehicles and machinery should be cleaned from the top down and taken apart where possible to allow cleaning of any internal spaces. Use of a broad-spectrum disinfectant following wash down reduces the risk of introducing bacteria, viruses and spores – threats that are not easy to see. Keep records of vehicle and machinery cleaning.

> **It is important to make sure that all vehicles and machinery that visit your property are clean to minimise any biosecurity risk**

### In conclusion

The above is not an exhaustive list. You should identify any additional types of vehicle or machinery movement onto your property and think about how to minimise any potential biosecurity risk that they may pose.

Remember, if you see anything unusual, do the right thing and report any suspect exotic pests or diseases via the Ministry for Primary Industries pest and disease hotline on **0800 80 99 66.**

*Disclaimer: While every effort has been made to ensure the information in this publication is accurate, HortNZ does not accept any responsibility or liability for error of fact, omission, interpretation or opinion that may be present, nor for the consequences of any decisions based on this information.*

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# 'AVOCADOS HAVE MY HEART,' SAYS 2021 YOUNG GROWER OF THE YEAR

Words by Andrew Bristol


*Melissa van den Heuvel wins*

## Melissa van den Heuvel won the Young Grower of the Year for 2021.

Melissa is an avocado grower services representative at Apata Group Limited, based in the Bay of Plenty.

"Avocados have my heart, as they are an amazing fruit," she says. "I am also over the moon to win this competition.

"Competing was quite challenging. We all have day jobs and sometimes you find yourself sitting there thinking about the orchard that needs picking or frost protection.

"The most challenging part of the competition itself was the leadership panel. Everyone found that daunting, not knowing the questions that would be thrown at us.

"We all had to speak on the challenges facing the industry but we all took a different angle. My angle was that there's something in horticulture for everyone, from accountancy to logistics. We need people coming in from other sectors so we can meet our challenges."

Melissa says she is very proud to be part of the horticulture industry. "It is something I am very passionate about. What we produce is very top notch," she says.

HortNZ President, Barry O'Neil, says supporting young people and encouraging more of them to join our industry is critical to our industry's continued success and growth, in what is the new normal – life affected by Covid-19.

"At times like these, having a cause and taking time out to celebrate it is even more important than it was before.

"This year's regional finals were oversubscribed, which shows the inherent optimism in our industry as well as the pride inherent in providing New Zealand and the world with tasty and healthy fruit and vegetables."

The national final was held at the Lower Hutt Events on 20 and 21 October, following all Alert Level 2 health and safety protocols.

> **"There's something in horticulture for everyone, from accountancy to logistics. We need people coming in from other sectors so we can meet our challenges**

The Young Grower of the Year, run by HortNZ, is an annual competition comprising regional finals in major fruit and vegetable growing areas, followed by a national final.

The competition is to encourage young people to take up a career in horticulture as well as to celebrate the success of young people in the industry.

This year's Young Grower of the Year finalists were:

- Heather Feetham, Pukekohe
- Jamie McIntyre, Gisborne
- Melissa van den Heuvel, Bay of Plenty (2020, but rest of competition cancelled due to Covid-19)
- Bryce Morrison, Bay of Plenty (2021)
- Regan Judd, Hawke's Bay
- Jonathan Bates, Nelson
- Jordan Carroll, Central Otago.

For more detail, please visit the Young Grower of the Year website: **https://www.younggrower.co.nz/**

Horticentre Charitable Trust


*Regan Judd*


*Finalists*

*Hortisports*

*Melissa van den Heuvel*

*Bryce Morrison*


*Jordan Carroll*


*Heather Feetham*

# JOY FOUND IN SUCCESSFUL DELIVERY OF RESEARCH

WOMEN IN HORTICULTURE

Words by Elaine Fisher

*Miriam Hall is a business manager with Plant & Food Research Ltd*

**Enabling and empowering great science is Miriam Hall's day job and it's one she absolutely loves. With a Master of Science in plant physiology and a Master of Business Administration, Miriam has found the ideal role for her talents and interests as a business manager with Plant & Food Research Ltd.**

"My current role is to work with customers to understand their needs and challenges and work with the science teams to help find solutions," says Miriam, who is also a member of Women in Horticulture.

Miriam works with HortNZ and vegetable product groups including Potatoes New Zealand and Onions New Zealand.

"It's a really diverse job and I love that I get to work with science and scientists on projects initiated from talking with customers," she says.

Seeing growers apply the results of scientific research that make positive differences to their businesses is an aspect of Miriam's job that she says she really enjoys.

"I worked in research for eight years, which combined with my degree, gave me the grounding and understanding for the work I now do with scientists. However, I came to realise that doing the science was not what brought me joy and that I could add more value by helping with the successful delivery of research to those who needed it."

Miriam grew up in Auckland in a family with a tradition of growing plants.

"My mum is a gardener and landscape designer and my grandparents loved gardening too, so taking a science degree at university and studying plants seemed logical to me."

> "Part of my role is to present the customer's perspective to scientists and the scientists' perspective to the customers

After graduating, Miriam worked for Crop and Food Research in a casual role until she was offered a research job at HortResearch looking at post-harvest issues, mainly in pipfruit, but also in kiwifruit and hops.

"What I really loved was doing research which growers could adopt within weeks or months, and then in the following season see the positive results come through in the harvest. That is very satisfying."

Not all research produces the results growers want. Miriam says in her current role, working with both scientists and growers, sometimes some difficult conversations need to be had.

"Science does not always say what people want it to say." And sometimes it is Miriam who has to deliver that message, so diplomacy has become an important skill.

"It helps if you can navigate relationships well and have empathy for all involved. Everyone has their own priorities and challenges, and part of my role is to present the customer's perspective to scientists and the scientists' perspective to the customers."

Miriam has also trained as a facilitator and designs and runs workshops internally for Plant & Food Research and externally as well. This combined with her management role, means in pre-Covid lockdown times she travelled frequently throughout New Zealand and offshore to meet customers and science teams and to run meetings and workshops.

> **"It is inspiring to see an increase in women in leadership positions across the primary industries**

Miriam has a strong interest in the legal side of commercial horticulture and this is something she wishes to grow her skills in and study further.

Within horticulture, Miriam has found a career which matches her interests and aspirations and at Plant & Food Research, a workplace in which women make up around 50% of the staff.

"Working in the primary sector at all levels is fantastic. There are a diverse range of opportunities from practical hands-on to research, management and administrative roles," Miriam says.

"It is inspiring to see an increase in women in leadership positions across the primary industries. Seeing people like themselves in leadership roles will give young girls a line of sight to become leaders of the future."

Pursuing a career in horticulture, and science in particular, opens many doors, she says, including doors to "a future in which there will be careers that don't even exist yet."

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

# **YOUR** INDUSTRY

**ACROSS THE SECTOR – ACROSS THE COUNTRY**

**28** PESTO PRODUCER

# BUMPY START TO THE SEASON FOR WAIKATO ASPARAGUS GROWERS

Words by Helena O'Neill

*Greenfern's operation mainly grows green, purple and white varieties of asparagus*

**GREENFERN ALSO GROWS ABOUT 1,500 GLOBE ARTICHOKE PLANTS AS PART OF ITS OPERATION**

**A prominent grower of asparagus in the mighty Waikato, Greenfern (Les Asperges Ltd), occupies 22-hectares of land in rural Cambridge. Thirteen of those hectares are established with plants, with a further 130,000 seedlings recently added to the site.**

Bill and Irene Cummings founded Greenfern in 2001, after having worked in the asparagus growing industry for 12 years. Their son, Hadyn, is also involved, running the day-to-day operations.

The family-owned and operated business has been organic for almost eight years, with a small amount spray-free but not yet organically certified crop.

Greenfern grows globe artichokes too, about 1,500 plants. The season is short, only around eight weeks, usually finishing at the end of November.

"You don't really ever see globe artichokes in the supermarket," says Irene.


*Hadyn Cummings is poised to follow in his parents' footsteps and run Greenfern when Bill and Irene retire*

"Well, I never had prior to growing them. They are a lot of work for a small return … people either know all about them or they don't. We do supply to a few restaurants and had huge demand after our season finished last year. So, it is growing in popularity."

Although the Cummings' operation has expanded to include other vegetables over the years, the focus continues to be on growing asparagus.

In addition to the standard green variety, a small amount of purple asparagus is harvested too – although Irene says it is difficult to grow, particularly as the local pukekos sit on the ferns and collapse them. The purple colour comes from the high level of anthocyanins in the spears, which also results in a more fruity taste, she says.

For the last ten to fifteen years, Greenfern has been using lightproof tunnel houses to grow a special variety – white asparagus. Its lack of colour comes from growing the green or purple varieties in total darkness. Dutch asparagus varieties were recently added to the operation's offerings too. Specifically bred for white spears, the new Dutch variety has a sweeter taste, is juicier and has a lower fibre content compared to green or purple spears.

"You can certainly see that we are growing better quality spears," says Irene. "They are popular over in Europe and a lot of the restaurants here like them also."

It's been a bumpy start to asparagus season for Bill and Irene.

One of their busiest periods is Labour Weekend. But this year, warmer nights in late September and early October meant their asparagus went into an early flush, right as parts of the Waikato plunged into yet another snap Covid-19 lockdown.

> "For the last ten to fifteen years, Greenfern has been using lightproof tunnel houses to grow a special variety – white asparagus

After just one week of restrictions, their operation was feeling the ramifications.

Irene usually attends the Waikato Farmers' Markets in Hamilton and Cambridge while her daughter runs the stand at the Tauranga Farmers' Market.

"All of a sudden, we were unable to sell at three farmers' markets," Irene says. "It all happened so quickly."

The lockdowns have meant that Greenfern has been unable to supply Auckland restaurants and retailers – their core customers and key stream of income.

"Restaurants and farmers' markets are a key part of our market," says Bill. "They are vital to getting our product out there and for making ourselves known."

**IN ADDITION TO THE STANDARD GREEN VARIETY, A SMALL AMOUNT OF PURPLE ASPARAGUS IS HARVESTED TOO**

**THE PURPLE COLOUR COMES FROM THE HIGH LEVEL OF ANTHOCYANINS IN THE SPEARS, WHICH ALSO RESULTS IN A MORE FRUITY TASTE**

*Cruden, Malikah, and Kaius Cummings show off some of the fresh produce at Greenfern (Les Asperges Ltd) near Cambridge*

A large portion of Greenfern's product goes to Ceres Organics and Chantal Organics, but restaurants remain Greenfern's key market – particularly for white asparagus.

"We depend hugely on the Auckland restaurants and also the ships that come in for our white asparagus," Irene says. "We had to increase the promotion of our 'white gold', as we call it, on our website when we got locked down so quickly."

> **"We had to increase the promotion of our 'white gold', as we call it, on our website when we got locked down so quickly**

Greenfern employs about eight pickers with another six staff in the packhouse. When borders closed due to Covid-19, the Cummings missed the usual influx of tourists that work over the asparagus season.

"We are in full production right now with white asparagus but we are really going to struggle," says Irene. "Selling it will be difficult without the restaurants too as it's a niche market."

# INDUSTRY CONNECTION A HIGHLIGHT FOR SCHOLARSHIP RECIPIENT

Words by Emma Boase : HortNZ people capability manager

*Reuben Dods*

**Reuben Dods is a first-year Master of Horticultural Science student at Massey University. He is researching the application of ultraviolet light recipes on plant gene expression with Agri-tech company BioLumic.**

Reuben is the 2021 recipient of the HortNZ Postgraduate Scholarship, receiving $10,000 and professional development opportunities.

Reuben first got excited about horticulture as a career while at Palmerston North Boys' High School. He was shopping around the subjects offered and fell into horticulture. Reuben is now an advocate for others getting into the industry.

> "There's a wealth of opportunity including options to travel and lots of exciting problems to explore"

"There's a wealth of opportunity including options to travel and lots of exciting problems to explore," says Reuben.

"There's something meaningful about being able to contribute to a core part of the New Zealand story – sustainable food and fibre production."

Reuben completed his Bachelor's degree in Plant Science at Massey University in 2020. He enjoyed being part of the Massey Hort Society and travelling to South Korea on a Prime Minister's Scholarship programme focused on horticulture opportunities for trade and knowledge exchange between the two countries.

> "There's something meaningful about being able to contribute to a core part of the New Zealand story – sustainable food and fibre production

The step into research for Reuben was natural. "I always enjoyed the nitty-gritty of doing science projects. Postgrad was never a definite but once I got involved with BioLumic and loved the team there, I agreed to take on this exciting project."



Applications for the 2022 postgraduate and undergraduate scholarships offered or administered by HortNZ are open until 10 December 2021.

For more information and to apply, visit**: www.hortnz.co.nz/scholarships**

The skills Reuben is developing are potentially vast. He hopes they will help him continue to create value for growers in the future.

"It's the first time I've managed a large project so I've learned a lot about planning and project management. I also work as part of a team and so I'm gaining more appreciation for the benefits of everyone contributing. I've gained a lot of technical skills but perhaps most importantly, I've gained skills in communication. Science communication, both written and verbal, and the ability of scientists to communicate their research is vital."

Reuben says conducting his research project is equipping him with the skills to take on further projects.

"I am passionate about working on innovative projects for growers, whether it's making things easier or creating a better return on investment for them. With global demand increasing at the same time as having to manage reductions in chemistry options, it's cool to be involved with this technology. There's huge potential – especially for the vegetable sector – to use ultraviolet light as an alternative to current chemistry options."

**Reuben has five tips for those considering postgraduate study:**

1. Work on a project you are actually interested in.
2. Find some funding – there's lots out there.
3. Get involved with a team that is welcoming and that will support you on your journey.
4. Doing it with a company is cool as it's real-world.
5. Build industry connections to help line up your next steps.

**HortNZ Postgraduate Scholarship**

The HortNZ Postgraduate Scholarship was first awarded in 2020 to encourage research in horticulture.

All scholarships also come with a range of industry networking and professional development opportunities.

# LOCKDOWN MISSION FOR TOMATO GROWER

Words by Helena O'Neill

*Staff practice social distancing and protection protocols in one of the packhouses at NZ Hothouse near Auckland*

**As the wider Auckland region endures more than two months in lockdown, a major tomato grower has embarked on a bold mission to vaccinate 100% of its staff.**

NZ Hothouse produces about a quarter of the country's tomatoes across its two glasshouses on the fringe of South Auckland. They also produce a large number of telegraph cucumbers.

NZ Hothouse managing director, Simon Watson, says more than eight weeks in lockdown is taking its toll on staff.

"There's quite a bit of Covid fatigue starting to set in now," Simon says. "Not only are they working full-time and pretty long hours under 'Covid conditions', they are also going home and they cannot go anywhere or do anything. It's one long grind. We have to be mindful of our people.

"At the end of the day, we are still going. The thing that makes us nervous is what happens if a community case winds up touching us.

"If we had a case in our packhouse for example, then that's 50-odd people who would not be able to work for some time. We would have to go through a deep clean and then we've got to restock with other workers. It would potentially put a big strain on the business.

Simon says, if bubbles are maintained and the business keeps to strict Covid-protocols, ideally, the unaffected parts of the business would stay operational should a case occur.

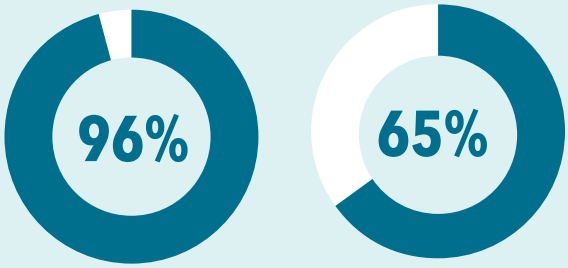
At this time of year, NZ Hothouse employs nearly 300 staff across its two major sites in the rural towns of Drury and Bombay.

"There has been a very aggressive campaign to get more people vaccinated here in Auckland, and pretty successfully too," says Simon. "We are getting pretty close to that 100% vaccination mark across the NZ Hothouse Group."

> "If we had a case in our packhouse for example, then that's 50-odd people who would not be able to work for some time

NZ Hothouse is actively encouraging its staff to get vaccinated against Covid-19, with the business aiming to get all of its staff vaccinated. They hosted a vaccination bus twice in October in a bid to immunise their whole workforce.


**THE BUS SPENT TWO HOURS AT EACH OF NZ HOTHOUSE'S SITES, WITH MORE THAN 50 STAFF VACCINATED ON ITS FIRST VISIT**




**BY MID-OCTOBER, 96% OF STAFF HAD RECEIVED THEIR FIRST VACCINATIONS AND 65% WERE FULLY VACCINATED**

The bus spent two hours at each of NZ Hothouse's sites, with more than 50 staff vaccinated on its first visit. By mid-October, 96% of staff had received their first vaccinations and 65% were fully vaccinated.

"The vaccine bus people are fantastic. It's a very well-oiled system, they rock in here and a bunch of them pile off the bus and start rattling through the vaccination process.

"What surprised us was that by fronting with the bus, it got some of the hesitant [people] over the line for a couple of reasons. One being that it made it easy for them because it was on work time. They were being paid to do it and it was right there. They also saw a lot of their workmates lining up and thought 'oh this is easy; I can do this'. It made the whole process a lot smoother and gave the more hesitant staff members the confidence to roll up their sleeve. I'd highly recommend it."

Despite the two months under heavy Covid-19 restrictions, NZ Hothouse has been able to retain normal staffing levels for this time of year.


*A driver from NZ Hothouse Group's transport arm, KPH, receives a Covid-19 shot from one of the vaccination bus staff*

"This lockdown has happened at the tail end of winter and early spring when our volumes aren't as high," says Simon. "But because we've been able to keep operating, we have picked up some workers from other employers who aren't able to work until Level 1. We've had no trouble getting staff at this time or through the lockdown.

"We are expecting to be under a bit of pressure for staff during our high season though, which begins November and ends around March."

While this latest lockdown sprang from the ethers, Simon says NZ Hothouse was well prepared. He did hold some concern for staff travelling to work from outside the Auckland alert level boundary but receiving essential worker exemptions for these staff members was a smooth process.

> **"By fronting with the bus, it got some of the hesitant [people] over the line for a couple of reasons. One being that it made it easy for them because it was on work time. They were being paid to do it and it was right there**

"The transition from Level 1 to Level 4 wasn't the shock that it was the first time," he says. "It wasn't a lot different from how we were operating before. We knew what was happening, what was coming and what was expected – as did the staff.

"You're having to put up with split shifts, we've got extra cleaning crews, we're operating in bubbles. We are not actively visiting some parts of our business because we're trying to maintain bubbles. It's all pretty taxing."

Simon says the government should recognise businesses that have high levels of vaccinated staff by removing restrictions placed on them.

"We should become the norm. The restrictions should come off those businesses who have high, or full rates of vaccination, and the restrictions should be placed on unvaccinated people instead.

"Our attitude is a fairly hard-line one, but it's ridiculous that the bulk of the population is treated as the exception. If you're unvaccinated, you should be the exception. That's what should happen going forward." ●

*NZ Hothouse staff wait for their Covid-19 jabs while the vaccination bus visits the Drury HQ in October*

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JULY 2019

# REGENERATIVE AGRICULTURE: THE LEADING EDGE OF LAND MANAGEMENT

Words by Heather Woods

*Streamside Organics owner-operators, Dominique and Logan. Photo; Heather Woods*

**Streamside Organics is a certified organic grower operating in the rural town of Leeston, just south of Christchurch.**

Owners, Dominique and Logan, have been working their slice of heaven for around three years now and believe that regenerative agriculture is the way forward.

They started small scale with just a single acre. Slowly, they grew to five acres and now, 50 acres later, they have scaled up in a way that suits their tools and range of produce. Despite offering a diverse range of crops, they're very efficient.

The team have their hands full, managing 30 to 40 species and 60 varieties across the farm.

Dominique says growing such a diverse range keeps things fun and different. "Plus, it's attractive to buyers to have a range of options – we like to make it easy and fun for our customers."

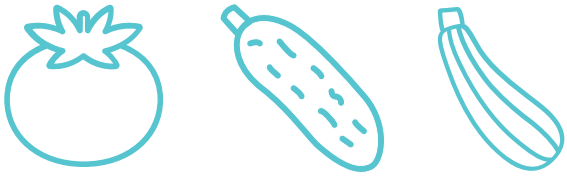
Such diversity means more investment in staff training and crop management, to ensure that harvesting techniques across all the crops are up to scratch and that their people feel happy and challenged in their roles.

And the benefits are clear, with consistent revenue from multiple streams helping to maintain a healthy operation: Farmers' Markets, New World supermarkets, restaurants, organic retail stores and their popular vegetable boxes that held their own at the height of the pandemic and have continued thriving since.

Streamside Organics has always operated as a grower of organic food. Everything they do meets AsureQuality standards and when it comes to trial and experimentation, they are forward-thinking.

"We're open to changing things, conducting trials with different species, and we don't just grow the one variety of crop, even if we know it works," Logan says.

**A NEW GREENHOUSE WILL SOON ADD TOMATOES, CUCUMBERS AND EARLY COURGETTES TO THE OPERATION, ALONG WITH SEEDLING PRODUCTION**



"Kale, for example. Some varieties flower earlier, at the end of the season. Having them a few weeks later is a big deal especially when there's nothing else around – it extends the growing season and offers more consistency to the consumer."

A new greenhouse will soon add tomatoes, cucumbers and early courgettes to the operation, along with seedling production. Logan acknowledges that more conventional methods of farming would mean fertilisers pumped through the land to keep it going, but Streamside can't do that. Enter regenerative agriculture.

> **"We're open to changing things, conducting trials with different species, and we don't just grow the one variety of crop, even if we know it works**

Inclusive of a natural pest control and intricate ecosystems, 'regen' agriculture means looking after soil health and aiming to grow robust plants that are tougher, happier, and grow better. Instead of bare, dusty fields, the end-goal is to see lush crops growing everywhere.

With so many species and varieties at Streamside, grown both organically and using regenerative principles, Logan admits there is a great deal of complexity. "A single-variety grower doesn't necessarily need the multiple tools, processes, systems and growing seasons that are needed across a farm like Streamside," Logan says.

**THE TEAM MANAGES**

# 30 TO 40 SPECIES AND 60 VARIETIES

**ACROSS THE FARM**

*Streamside Organics' sunflower cover crop. Photo; Joel Rock*

An organic farm working with regenerative agriculture principles is a constant mind maze of 'what's going into the ground for produce' versus the end goal of a sustainable system, he says. Layer that with managing over 40 crops on rotation and you'll begin to understand what they're dealing with.

Even so, Dominique still maintains that regenerative agriculture and organically grown food are "where things are headed."

Consumers are more aware of the environment than ever before, thinking twice about what they fill their pantry with – where it comes from, how it is produced and the wider impact their food is having on the environment.

"There are many challenges ahead, so we all need to learn more. The more we learn, the better we get at it," Dominique says. "Regen agriculture is just one of the pathways we can take to improve."

*One of Streamside Organics' many cover crops. Photo; Heather Woods*

**The working success story: regenerative agriculture**

With most budgets directed into traditional farming, not a lot of research and development (R&D) has been conducted on regenerative agriculture. However, biological control research does benefit organic farming, so there is some overlap. What we do know is that soil fertility is the most important part of organic farming. The United Nations suggests a majority of global soil resources are in fair, poor or very poor condition.[1] Poor soil conditions could mean that food production levels are reduced in future. If you like eating, that should be a scary thought.

Regenerative agriculture uses covered crops as a natural way of cultivating and maintaining land to create a sustainable cycle. It has advantages like increasing soil health, reducing weeds, natural management of erosion and putting valuable nutrients directly into the soil. Organic matter increases, along with water absorption, and entire ecosystems are built that support our natural pest controls – the beneficial insects.

**"Regenerative agriculture uses covered crops as a natural way of cultivating and maintaining land to create a sustainable cycle. It has advantages like increasing soil health, reducing weeds, natural management of erosion and putting valuable nutrients directly into the soil**

*1. www.nature.com/articles/s41467-017-02142-7*

*A new on-site greenhouse will soon add tomatoes, cucumbers, courgettes and seedling production to the operation. Photo; Heather Woods*

Dominique and Logan are embracing regenerative agriculture and what it looks like on a cropping farm. Over winter they mostly use lupins – tick beans, rye corn, phacelia and clover – as their cover crop, which all become a kind of live compost that is mowed and hoed into the ground. The summer mix changes slightly to include faba tick beans, buckwheat and sunflowers, which have big tap roots, great for breaking up soil compaction and creating ample organic matter.

All plants play different roles. Some species, like rye corn, can be too invasive for short-term use and are hard to phase out, although useful for longer growing periods. Lighter species like buckwheat decompose back into the soil quickly. Buckwheat is also a good plant for beneficial insects like parasitic wasps (the flower nectar extends their life) so Dominique and Logan grow as much as they can to support the insects. Phacelia provides an important food source for bees and gives them a stable place to live. It is also a great soil conditioner. Right now, as we enter spring, 50% of the Streamside cropping area is in cover. It creates an ecosystem that supports the land.

The challenge with cropping is that cultivation can damage the soil structure but regenerative practices help to rebuild it. Dominique and Logan are always looking at ways to reduce tillage and hope that as more research becomes available, so too will specific tools designed for a cropping farm. In the meantime, it's trial and error.

In the case of potatoes, it is difficult to grow them psyllid-free if they aren't covered. A proper psyllid mesh is important for all new crops. Streamside uses cloth netting.

"Canterbury winds do wreak havoc though, so keeping them covered is tricky," Dominique says.

A crop of fennel was sacrificed recently due to aphids, but Dominique and Logan kept that crop going knowing that the aphids would attract ladybirds and bring balance later in the season.

By actively working to implement more regenerative practices, Dominique and Logan have found they are gradually experiencing fewer issues with their crops. And they are at the front of the pack having built a strong bank of learnings.

"If you just copy others, you won't understand the background that leads to the success of a viable farm," Dominique says.

# PANDEMIC PROMPTS PESTO PRODUCER TO GO-LOCAL

Words by Elaine Fisher

*Southern Fresh grows basil both inside and outside*

**The effects of the Covid-19 pandemic have prompted Levin pesto company, Genoese Foods Ltd, to source its basil from New Zealand instead of Fiji. The shift has not only helped to retain staff, but has benefitted Cambridge salad, vegetable and herb grower, Southern Fresh Group, too.**

Genoese had previously flown in basil for its pesto from Fiji, but co-owner Andrew Parkin says the pandemic and the 2020 lockdowns made it clear the company would need to secure a local supply.

"We had been sourcing basil from our own Fiji farm since the early 1990s. The climate is conducive to basil growing as it is warm and temperate, meaning the crop can be grown and harvested for a far longer part of the year than in New Zealand.

"However, it had become more difficult in terms of biosecurity and sustainability as well as the costs – both monetary and environmental – to airfreight a very light, air-filled crop that takes up a lot of room. Supply continuity was also put under significant pressure when Covid-19 first emerged," says Andrew.

Aware of the pressures on the Fijian basil supply, Genoese had already begun conducting trials with several New Zealand growers with the idea of complementing the quantities from Fiji.

"Southern Fresh Foods was one of those growers," Andrew says. "When Covid hit, they were well placed to be able to scale up what they were growing for us. We then made the decision to close the Fiji operation."

Forming the relationship with Southern Fresh was crucial for Genoese. Without a secure basil supply, Genoese's ability to operate would have been severely impacted and placed jobs in jeopardy, says Andrew.

**SOUTHERN FRESH HAS BEEN GROWING BASIL FOR**

**20 YEARS**

*High-quality basil for Genoese Foods pesto is grown both inside and outside by Southern Fresh Group of Cambridge*

*Genoese Foods co-owner, Andrew Parkin*

"The New Zealand supply has allowed us to maintain the business and in fact grow. Consumers who turned to preparing more meals at home, as a result of Covid, have been using more of our product, and we are adding to our Quality Assurance team due to the increased production in New Zealand."Fortunately, growing trials were already underway and could be scaled up.

"We were also lucky to be able to take a large amount of basil crop that Southern Fresh had grown which was destined for hospitality customers. When lockdown occurred, those businesses couldn't operate, but we were able to take on that surplus instead."

Southern Fresh sales and marketing manager, Garth Dunn, says the contract has been a great step forward for them too.

"It has enabled us to utilise our indoor and outdoor growing capability, and we have been working really closely with Genoese to ensure we meet their high standards in terms of flavour profile, leaf colour and leaf specifications," Garth says.

> "This contract has been a great step forward for us

"Crops had been wasted due to Covid over the last year. We minimised this as much as we could by offering crops to charity. Because of Genoese's contract, Southern Fresh has been able to increase its production of basil and retain its full complement of staff.

*Southern Fresh Group has more than 161ha of fertile soil outside in which to grow*

"Basil has always been a big focus for Southern Fresh and we have been growing it for 20 years. However, with the increased demand we have scaled our production and our indoor farm has allowed us to do so efficiently and effectively.

Southern Fresh has 400 acres (more than 161 ha) of fertile soil outside where it grows its basil, as well as an indoor farm for growing during the winter months.

> **"We are planting and harvesting basil daily by machine and by hand for all our customers**

"Our indoor farm is perfect for growing basil as we have 100% control over the growing environment," says Garth. "We are planting and harvesting basil daily by machine and by hand for all our customers."

Like many businesses, Covid-19 made Genoese take a closer look at its operations.

"We had some legacy pesto that didn't fit our values so reformulated them," says Andrew. "The customer response has been incredibly positive and we are seeing some good growth. Covid put things in perspective, removed some fear of change and gave us that nudge to get it done."

With more than 25 years of growing basil in Fiji, Genoese has developed a good understanding of what it takes to grow great basil and how to transport it to their pesto plant in the best condition.

"Southern Fresh operate a HACCP (Hazard analysis and critical control points) based Food Safety Programme and operate NZGAP (New Zealand Good Agricultural Practice) for the growing operation. We regularly audit them. They have been open and easy to work with on any ideas to improve for win-win solutions."

Fresh is best and with basil being highly perishable, Genoese receives regular consignments from Southern Fresh.

"In October we were receiving two deliveries per week," says Andrew. "From January to March, volumes will ramp up to over 4,000kg per week across three deliveries. This also fits well with Southern Fresh who pick and ship all their other produce daily."

Southern Fresh Foods was established more than 20 years ago by the Dunn family, who still own and operate it today. It has gone from its humble beginnings to become one of New Zealand's leading growers and processors of high-quality, specialty baby vegetables, gourmet salads, and fresh herbs.

**SOUTHERN FRESH HAS**

# 400 ACRES

**OF FERTILE SOIL OUTSIDE WHERE IT GROWS ITS BASIL, AS WELL AS AN INDOOR FARM FOR GROWING DURING THE WINTER MONTHS**

*Demand for Genoese pesto has increased during Covid lockdowns as more people prepare home cooked meals*

The company has a reputation for innovation, including building New Zealand's first automated hydroponic system and growing the only Trio lettuce in New Zealand. In 2019 it began construction of a 20,000m$^2$ indoor farm, providing a consistent supply of product year-round.

The contract with Genoese has enabled Southern Fresh to continue to maximise its infrastructure and at the same time continue to supply high quality, fresh food to New Zealanders.

# HINEMOA QUALITY PRODUCERS GET PROACTIVE WITH FARM ENVIRONMENT PLANS

Words by Geoff Lewis. Photos by Trefor Ward

*Hinemoa Quality Producers Ltd, Chris Nicholson, on site in one of his potato fields*

**On the rolling country hills of Pukekawa sits a 215-hectare potato and onion growing operation that is leading the way in meeting the goals of a modern Farm Environment Plan (FEP).**

Chris and Vikki Nicholson own and run Hinemoa Quality Producers Limited; an operation blessed with beautiful Pukekohe volcanic soil. They are doing their best to not just maintain it but improve all aspects of their operation while practicing nutrient and sediment control.

The Nicholsons are in the middle of an ambitious 15-year project which aims to fill some of the property's gullies to create nine additional hectares of cropping land.

> "The Nicholsons are in the middle of an ambitious 15-year project which aims to fill some of the property's gullies to create nine additional hectares of cropping land

Chris says a large part of that project is also to ensure the farm's soil remains productive.

"Growing requires water and water storage," says Chris. "Equally, growing requires healthy soil. We are trying to future proof both."

The project is also a test in the science of erosion and nutrient control.

One of the on-farm gullies has received consent to be converted into another three-hectare reservoir which will hold up to 80,000 cubic metres of water. This will complement the 45,000 cubic metre capacity of the operation's primary dam. Another gully system has been planted in native flora to control erosion and retain silt, and several specially designed Sediment Retention Ponds (SRP) have been installed on the property to ensure that heavy rain events don't wash significant quantities of soil off growing areas. These engineered ponds are part of a suite of practices being implemented on the property to manage erosion, sediment loss and nutrient runoff from commercial vegetable production.

The average annual erosion rate around the Pukekohe region is five to seven tonnes per hectare depending on the slope. Five tonnes per hectare equates to

approximately 0.5mm of soil loss per year. Cover crops help prevent soil loss as their root systems hold the ground. Specially designed and built SRPs also allow the 'bedload', or heavier material, to drop out of the run-off. The suspended sediment eventually settles over time and the soil that amasses can then be scooped out by digger and returned to the tops of the paddocks.

Hinemoa has ten hectares of lucerne, which, along with barley and mustard, works to fix nitrogen, hold and condition the soil, while providing commercially saleable fodder crops.

"The lucerne programme is part of our nitrogen programme," Chris says. "It is a nitrogen fixer and soil conditioner. We spray out a block and plant lucerne to put nitrogen back and hold the soil. We don't use any nitrogen, just plough it back in."

Using cover crops to fix available soil nitrogen post-harvest means less nitrogen fertiliser is needed to establish the next crop, in turn reducing the nitrogen leaching risk and nitrous oxide emissions.

> **"One of the on-farm gullies has received consent to be converted into another three-hectare reservoir which will hold up to 80,000 cubic metres of water. This will complement the 45,000 cubic metre capacity of the operation's primary dam**

Installation of solar panels marked a further milestone in the Nicholsons' operation – becoming fully self-sufficient. Costing a hefty $86,000 to install, the panels have been placed on the expansive roof of one of their main sheds and have already reduced Hinemoa's monthly electricity bill from $1,200 to $300. Any excess generation is sold back to the grid.

*Recently installed solar panels on Hinemoa's roof have reduced its monthly electricity bill to $300*

Vikki attended a Farm Environment Plan and Nutrient workshop back in June along with about 60 indoor and outdoor growers and industry reps. The purpose of Farm Environment Plans is to assess and manage the risks to the environment on-farm. This means minimising the run-off of sediment and nutrients into waterways and lakes and reducing greenhouse gas emissions.

Vikki says the workshops are necessary to help growers understand the complexities surrounding FEPs.

"I was able to make notes to take back to our agronomists around soil testing requirements. In particular, the quick tests between planting and side dressing are things we could look to implement.

"Most of the nutrient management processes are being done automatically by growers, and compliance is already

*Agricultural engineering consultant and Agrilink director Andrew Barber (left) and Chris Nicholson discuss a sediment control plan*

being monitored through industry programmes such as NZGAP (Good Agricultural Practice). But it is imperative that these models are integrated with the FEP so that the audit process does not become a frightening beast."

Vikki says the most frustrating aspect of FEPs is being held to account by councils using outdated data around nitrogen.

"The point of growing sustainably and profitably is to get the greatest yields from the lowest inputs," Vikki says.

*Sediment traps showing fine silt and coarse sediment collection areas*

"However, if this affects quality in a competitive market, we stand to lose business.

"It is a very daunting process for a medium-sized, family-run businesses who don't have the resources to employ full-time soil sampling personnel. Compliance is becoming a large part of the business model. If you don't have the expertise yourself, you have to engage consultants which is costly and time consuming.

> **"Hinemoa has ten hectares of lucerne, which, along with barley and mustard, works to fix nitrogen, hold and condition the soil, while providing commercially saleable fodder crops**

"My concern is it may see the small growers pushed out altogether."

Meanwhile, work on any further development of Hinemoa's FEP is on hold due to the Auckland Covid-19 lockdown.

"Chris hasn't had a day off," says Vikki. "Labour is extremely challenging. We can't get people and we have staff who also can't get back to New Zealand. We would usually have university students working for us in November, but who wants to work in Auckland right now?

"People will realise what's happening if we have to hoe the crop in because we can't get it off the ground." ●

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# WEIRD AND WONDERFUL PRODUCE BOX REDUCING FOOD WASTE

Words by Glenys Christian


*Misfit Garden embraces weird and ugly 'misfit' produce*

**It is a case of the weirder the better for two Taupō women on a mission to make fruit and vegetables exciting.**

Their food box deliveries of misshapen or irregular produce are growing exponentially as customers appreciate not only the variety, but the fact they are helping to reduce food waste.

Sofia Dekovic and Jen Long set up Misfit Garden 13 months ago to provide growers another outlet for fruit and vegetables for which they couldn't find a buyer. Sofia, a chef from Chile, and Jen, a Scottish biologist, met in France then came to New Zealand, initially settling in Queenstown. They moved to Taupō three years ago and wanted to buy local food at farmers' markets – a standard practice in Sofia's homeland.

> "There is a misconception that this produce is reject. But nine times out of ten, it is fresher because it hasn't been in a coolstore

"Growing up in Scotland, my family grew and ate all their own vegetables," Jen says.

They were also aware of growing food waste with a lot of fruit and vegetables which didn't meet supermarket standards going to cattle feed.

"It is totally insane that growers were over-planting for when their vegetables didn't come out straight," she says.

"There is a misconception that this produce is reject. But nine times out of ten, it is fresher because it hasn't been in a coolstore."

*Nearly-perfect carrots and Brussels sprouts that were destined for cattle food. Misfit Garden produce boxes and their charity scheme ensure they are not wasted*

Initially, when Jen and Sofia first approached local growers, the usual response was they had no wastage and no rejects.

"Three weeks later, one grower called back and said he had a whole crop of mandarins which were too small," Jen says. "So, we had 600 kilograms of them and zero customers. It's been very chicken and egg."

That small beginning gave the duo confidence to persevere and run a stall at Taupō's craft market for three months, allowing them to meet a range of potential customers and spread the word.

After the first lockdown in 2020, they decided the time was right to launch a fruit and vegetable box delivery service. In addition to working their full-time jobs, Jen and Sofia sourced produce, packed in the mornings and delivered in the afternoons – Tuesday through Thursday.

Growing their business to 200 subscribers has extended their delivery area outside of Taupō's 30,000 population base to Turangi and other settlements around Lake Taupō.

Customers can opt for weekly, fortnightly or three-weekly deliveries of 'mini' or 'massive' fruit and vegetable boxes.

As of October, Sophia decided to give up her role as a chef to fully concentrate on expanding the business. Jen now only works one day a week too – the remainder of her time is invested into Misfit Garden.

> **"The fact that the business wants the "weird" and "bendy" root vegetables which would otherwise be rejected, gives growers quite a bit of enjoyment too**

Their plans are to extend deliveries to Rotorua, Reporoa and then Whakatāne, which will involve a recruitment of more staff to facilitate order packing in their warehouse.

*Misfit Garden founders, Jen Long (left) and Sofia Dekovic, have experienced exponential growth of their produce box business since it started just over a year ago*

Jen says the relationships they have developed with growers have been "amazing". About 16 growers have supplied the operation with produce at least twice. A Katikati avocado grower brought them reject fruit last year rather than sending it away to be processed for oil. With a price drop in this year's avocado crop, it means they are supplying fruit that would otherwise have been exported. Two Ohakune growers supplied carrots and Brussels sprouts this winter and a Hawke's Bay small-scale grower keeps Misfit Garden in mind when they have a silverbeet crop that bolts or is affected by heavy rain, making it unsuitable to be sold to the major supermarket chains due to cosmetic imperfections.

"It's not good enough for Pak'nSave but it is good enough for us," says Jen.

The fact that the business wants the "weird" and "bendy" root vegetables which would otherwise be rejected, gives growers quite a bit of enjoyment too, Jen says.

"The weirder the better."

Misfit Garden will look for more suppliers as the business expands in order to provide customers with the option to customise their produce boxes – swapping out particular items so they get what they most enjoy.

They won't be landed with an aubergine or Jerusalem artichoke if they particularly dislike them, for example.

But Jen says including the unusual often generates a great result with parents who send in photos of their kids excited when the box arrives and eager to find out what it contains.

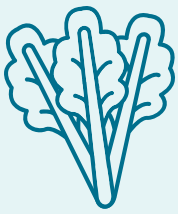
That can lead to those who are often fussy eaters trying a variety of different vegetables such as yacon, purple carrots and celeriac.

In line with their ambition to be 100% waste-free, Misfit Garden also donates any remaining fruit and vegetables to local charities, including the Taupo Baptist Church, Love Bank and two local Kai Pantries. That way, nothing goes to waste.

Jen estimates half their customers buy because they want to reduce food waste and half because of the novelty value.

**A KATIKATI AVOCADO GROWER BROUGHT THEM REJECT FRUIT LAST YEAR**

**TWO OHAKUNE GROWERS SUPPLIED CARROTS AND BRUSSELS SPROUTS THIS WINTER**



**A HAWKE'S BAY GROWER SUPPLIES THEM WITH SILVERBEET WHEN IT BOLTS OR IS AFFECTED BY HEAVY RAIN**

*Premium spray-free rainbow chard and silverbeet from an emergency harvest*


"We have a big mix of customers with some who have chosen a vegan or vegetarian lifestyle," she says.

> **"Misfit Garden also donates any remaining fruit and vegetables to local charities, including the Taupō Baptist Church, Love Bank and two local Kai Pantries. That way, nothing goes to waste**

"Others just love that they get a funny, two-legged carrot in their produce box." ●

# OPINION

# VEGETABLE GROWERS THE FOUNDATION OF FOOD SECURITY AND WELLBEING IN NZ

Words by John Murphy : VNZI board chair

**For New Zealand to maintain national food security, our vegetable growers have to run viable businesses that can provide for their families.**

Obviously, we must operate in an environmentally friendly way to continue to grow. Our growers need the support of consumers and regulators to get even better at this. With that and our commitment to improvement, we can keep contributing to the well-being of our people.

The year 2020 presented what we hoped might be a unique circumstance of ongoing lockdowns on the doorstep of New Zealand's vegetable growing hub. Unfortunately, the damaging Delta variant has continued to complicate life in 2021, especially the day-to-day activities in vegetable growing operations.

We've adapted to our staff working at distance and in bubbles, ensured rigorous hygiene measures are in place, and put the general well-being of our workmates first. When New Zealanders needed the comfort of fresh, healthy produce abundantly available on their shelves, we worked our tails off and delivered.

And yet, the viability of our businesses seems less secure than ever. Input costs have skyrocketed recently, with compliance concerning the quality of water in local rivers, energy and people all presenting hikes in our cost of doing business. Add exponential increases in the cost of shipping, fertiliser and fuel, and the recipe is one of high cost for even the leanest of farm operations.

One of the most alarming recent increases in cost is energy. Spot electricity prices have surged, as has coal use to help fire the national grid. At the same time our covered crop growers are being told that use of electricity from the national grid will drive a greener economy. Supply of efficient energy sources such as natural gas are being undermined by the prevailing attitude that these are 'yesterday's fuels.'

Many of our best performing covered cropping operations use natural gas with impressive results. Amongst other products, they are internationally successful purveyors of the best capsicums, tomatoes and cucumbers that anyone can find. Covered cropping also has the potential to insulate us somewhat from changing weather patterns that significantly affect outdoor cropping.

The New Zealand vegetable industry is absolutely committed to innovation that will improve our energy footprint. Where commercial reality and good intentions collide, the environment and our people will win.

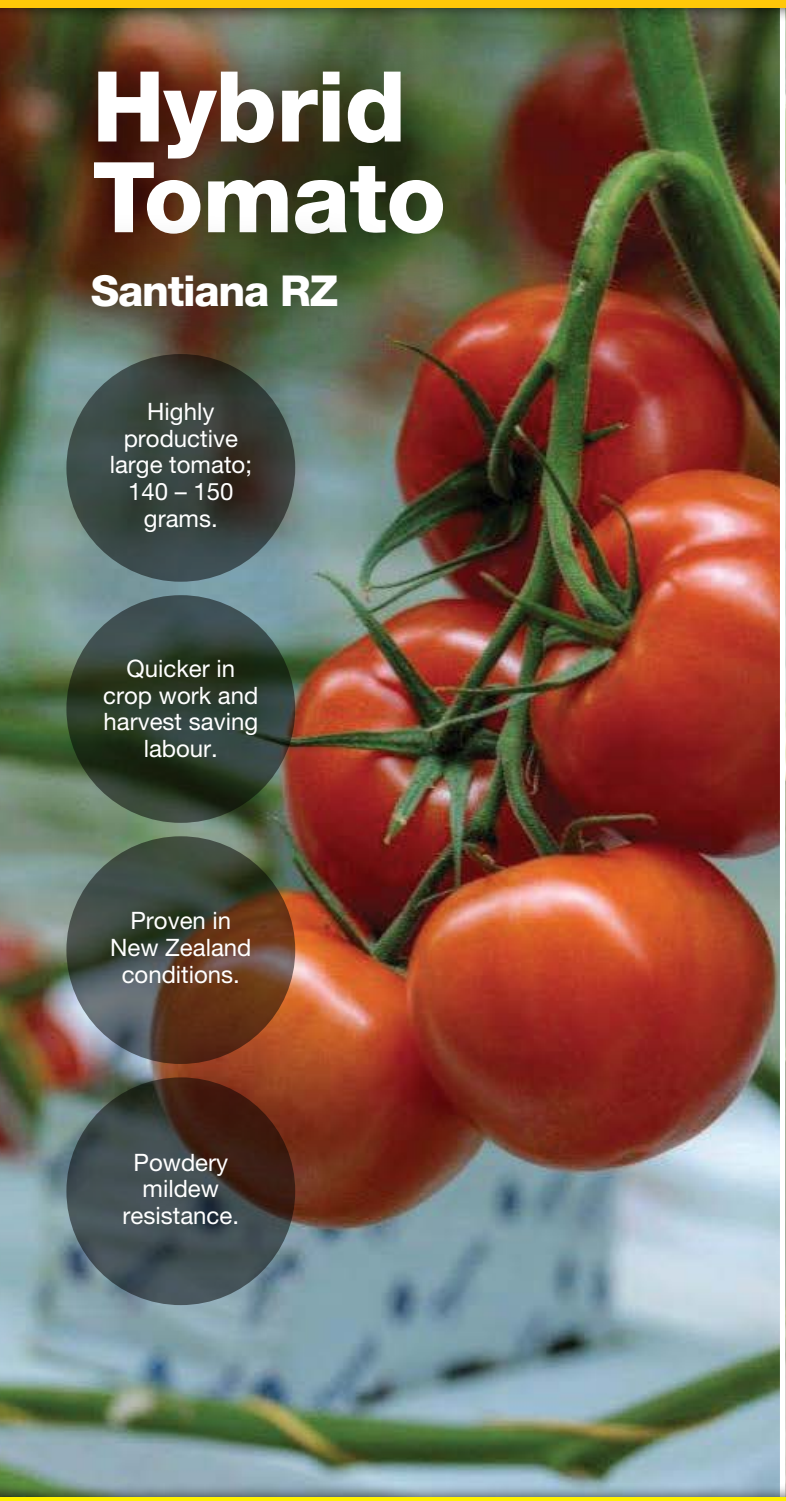
> **"The New Zealand vegetable industry is absolutely committed to innovation that will improve our energy footprint**

We have asked the regulators for time – we need a reasonable and equitable chance to decarbonise. It simply can't happen with the flick of a switch. There is a serious risk that hastily converting to electricity via the grid will increase our footprint, not decrease it. This year coal has been burnt in massive quantities to fire the turbines that power the grid.

To support our improvement, what we ultimately need is New Zealanders to continue buying our goods. There is a serious risk that cost increases due to government energy policies will render us uncompetitive against competitors from places where inefficient energy use isn't penalised. Exporting pollution by buying inferior competitors' goods only adds to the footprint we seek to limit.

With our commitment to getting better, and the support of government and consumers, we will remain relevant and drive improvement. This means we can continue to be the foundation of New Zealand's food security.

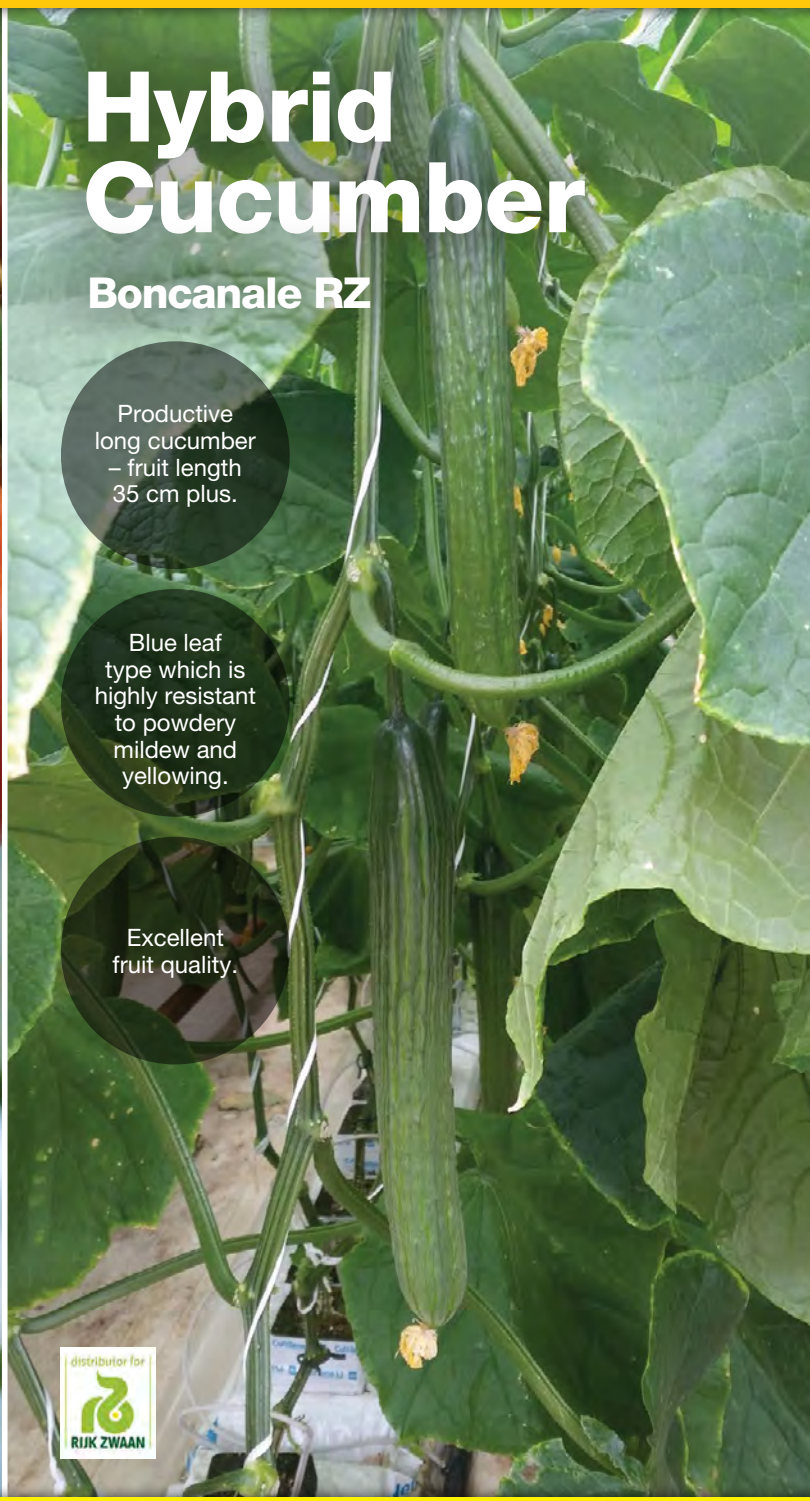
# Thinking vegetable seeds? Think **Terranova.**



## Hybrid Tomato

### Santiana RZ

- Highly productive large tomato; 140 – 150 grams.
- Quicker in crop work and harvest saving labour.
- Proven in New Zealand conditions.
- Powdery mildew resistance.



## Hybrid Cucumber

### Boncanale RZ

- Productive long cucumber – fruit length 35 cm plus.
- Blue leaf type which is highly resistant to powdery mildew and yellowing.
- Excellent fruit quality.

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LK-TS159

# MAKING A BUZZ IN HORTICULTURE

Words by Helena O'Neill


*Mating bumblebees at Zonda Beneficials at Waiuku*

**Tucked away on the outskirts of Waiuku, 40km southwest of Auckland, Zonda Beneficials is buzzing over the increasing potential bumblebees offer the horticulture industry.**

Company director and project chairperson Roelf Schreuder, independent consultant Dr Jo Stephens, and research assistant and lead researcher Dr Gunjan Gera, are working together on a four-year research project looking into ways to keep bumblebees pollinating for longer. They are also investigating mass breeding programmes for predatory mites.

The project has three main objectives:

- Improving commercial bumblebee hives
- Developing a mass-rearing programme for predatory mite *A. limonicus* (Limonica),
- Improving the existing mass breeding program for predatory mite *P. persimilis* (Spidex)

It is hoped that the project will also open up reliable options for growers in terms of pollination and predator control.

Zonda Beneficials production and research and development manager, Dr Gunjan Gera, says bumblebees are crucial for the pollination of many kinds of produce, especially tomatoes and blueberries. Bumblebees are of increasing interest to growers of other berry fruit too, as well as crops like avocado, kiwifruit and passionfruit.

"It's not a big market in New Zealand," says Gunjan. "Bumblebees have small colonies in comparison to honey bees."

Bumblebees are exceptionally effective pollinators of crops in greenhouses, under covered crops and in open-air situations, she says.

They can work in low light conditions, while also being able to fly in temperatures as low as 8 degrees Celsius, in light rain, windy conditions and heavy cloud cover. Another advantage for growers and orchardists is that bumblebees will only travel in a 100–200 metre radius of the hive, so they remain within the crop requiring pollination.

A major part of the research looks at using a pheromone to mimic the one excreted by the queen bumblebee in the hope hives will pollinate for longer.

"All these social organisms like bumblebees are controlled by the pheromone released by the queen," Gunjan says. "As long as the queen is healthy, she will keep producing and releasing that pheromone.

"In the field, the queen of a commercial bumblebee hive lives for approximately 10 weeks, then the hive winds down once the queen dies. This part [of the research project] aims to explore the option if the hive can continue to survive and pollinate even after the queen dies."

The technology is in its infancy overseas, she says.

Hives are normally replaced by growers every three to four weeks, but researchers hope that could be extended to at least six to eight weeks.

Early pioneers introduced bumblebees to New Zealand from the United Kingdom, which means there is limited genetic diversity.

"They are quite narrow in genetic diversity and very susceptible to weather, stressors, disease, pathogens and all kinds of factors – so, they don't perform very well. You will often hear New Zealand growers saying bumblebees don't work, they're expensive.

"The population is not robust or big enough. That's what we're trying to achieve here, to make our bumblebees more robust in terms of pollination."

*Zonda Beneficials production and R&D manager, Dr Gunjan Gera, is the lead researcher for the project*

> **Bumblebees are crucial for the pollination of many kinds of produce, especially tomatoes and blueberries**

Another part of the work involves researchers screening bumblebees for disease to improve the overall health of the hives

The Limonica mite is a very effective predatory mite, native to New Zealand, which can deal with a wide range of pests including aphids, thrips, and whiteflies.

Despite being a New Zealand native, the mites are only commercially available from the Netherlands, where they have been successfully bred for many years.

Gunjan hopes to create a mass-breeding programme here in New Zealand which would reduce supply shortages that arose due to Covid-19 as well as lowering costs, as the mites would be sourced locally instead of offshore.

"It's a New Zealand native and someone else is breeding it and selling it to us."

The final objective aims to improve the existing breeding programme for Spidex (*P. persimilis*). This is a very effective predator of two-spotted mites but the supply to growers is hindered by unpredictable environmental factors including the weather and also being outnumbered by other mites in their habitat.

"We are very much dependent on environmental factors. We want to make the system sophisticated and uniform so growers can have access to this brilliant mite all year round."

The three-tiered project is partially funded by the Ministry for Primary Industries with a $160,000 grant from its *Sustainable Food and Fibre Futures* fund. New Zealand Gourmet, which owns Zonda Beneficials, is funding the remaining $240,000.

The project faced several delays due to the Covid-19 outbreak, but finally started in July last year and is expected to conclude at the end of 2023.

In the meantime, Gunjan says that commercial growers and gardeners alike can help our bumblebees by planting wildflowers to ensure they are well-fed.

# WORKPLACE ASSESSORS: MAKING A REAL DIFFERENCE TO TRAINING AND DEVELOPMENT

Supplied

**Training someone while they are working can sometimes be tricky to juggle for a business, and that is why a workplace assessor is such a key part of success.**

They oversee the formal marking process and provide mentoring, either within their own workplace or independently. They are a vital part of maintaining the quality of Primary Industry Training Organisation (ITO) qualifications and programmes.

A workplace assessor could be an experienced supervisor or manager who works in an organisation that has trainees, or they could work independently for many businesses. They are registered with the Primary ITO to assess employees in the workplace.

There are massive benefits for a workplace having its own assessors. It means that:

- The trainee can be assessed without having to stop working or travel somewhere.
- The assessor intimately understands the workplace and often knows the trainee.
- The assessment costs are often reduced for the organisation.
- It's easier to adjust assessment practices to suit the workplace situation and the trainee.

However, if you are a small business, independent workplace assessors play a vital role. All trainees need some form of assessment in order to complete their programmes.

Because the assessor plays such an important role in the learner experience, there are some processes in place to ensure that learners, employers and assessors are getting a consistent quality of experience.

In addition to being registered as workplace assessors with the Primary ITO, assessors are expected to have a minimum level of professional training (Unit Standard 4098 for workplace and affiliate assessors). The Primary ITO Quality team also regularly review the workplace assessors' professional practice, and assessors are expected to participate in ongoing continuing professional development workshops offered by Primary ITO.

Primary ITO sector manager, Adam Fleck, notes *"workplace assessors play such a critical role in supporting learners to achieve. We have over 700 workplace assessors throughout the country who take their assessing role really seriously and do a great job at it."*


*Heather Feetham*

Workplace assessors have a lot of responsibility – they're required to make the final decision regarding a learner's competency, and they have the authority to register the assessment results with Primary ITO, who report those to NZQA (the New Zealand Qualifications Authority). After registering results, all workplace assessors have to hold the evidence of their judgement for a minimum period of two years.

Heather Feetham, 2021 Pukekohe Young Grower of the Year winner, is a production manager at T&G Fresh and has been a workplace assessor for around four months.

*"Currently I have three trainees that I work alongside. It's great as working towards a qualification gives our staff the opportunity for professional development, and provides greater personal satisfaction within their role. The assessing also doesn't take too long each week. It took a while to get my head around the actual bookwork and to organise the flow of the learning but it's been really worth it."*

*"…it has also been great professional development for myself as it adds depth to my training knowledge and abilities plus adds value back to the business by having staff that are well-trained and assessed at a high level."*

### How does assessment work alongside trainees?

**1 Assessment and learning are linked.**

When assessment happens during learning, it is usually informal such as when a supervisor gives a trainee feedback on how they are getting on with a particular aspect of their work.

There are other forms of assessment that occur on the job which are explained in detail when someone registers to become an assessor with Primary ITO.

**2 Assessment is an ongoing process, not a one-off event.**

When well designed and implemented, assessment provides opportunities for trainees to demonstrate the knowledge and skills required to meet competency standards. It is therefore not just a one-off event that happens between assessors and trainees. Assessment is the evidence gathering process carried out by trainees, verifiers and assessors that supports trainees to achieve what is required for gaining qualifications.

**3 Validity and reliability are strengthened when there are several sources of evidence.**

Workplace learning frequently involves dividing the roles of teacher or trainer, assessor and evidence collector between different people. This makes workplace learning different from other education settings.

### What does it take to be an assessor?

Workplace assessors are committed to the industry and to supporting learners and employers. Our assessors enjoy being able to support trainees and often see it as professional development for themselves as much as for their workplace. Workplace-based assessors are often nominated by others for the role and on the basis of their technical expertise. It is important to also consider other attributes such as good communication skills, literacy and numeracy skills, thoroughness and trustworthiness, because these are essential to being a good assessor. The ability to assess across a range of unit standards requires assessors to have a deep understanding of what they are assessing, as well as the important 'soft skills.'

No matter the size of your business, if you feel you have the attributes to be a good workplace assessor, get in contact with Primary ITO to discuss this further.

### Government support for training and apprenticeships

As of 1 July 2020, the government will cover training fees until 31 December 2022 for training in many of our primary sector industries.

For more information on this fund, and the Apprenticeship Boost for employers, visit **www.primaryito.ac.nz.**

# TECHNICAL

THE LATEST INNOVATIONS AND IMPROVEMENTS

# $CO_2$ ENRICHMENT IN CHANGING TIMES

Words by Elly Nederhoff : Crophouse Ltd


*Hot Lime Labs pilot system, producing $CO_2$ from waste wood*

**The greenhouse industry is facing mounting challenges in the energy space, with extreme increases in energy prices, increasing carbon emission costs and uncertainty about natural gas supply after 2022. With these uncertainties in mind, many growers are looking for alternative energy options.**

One aspect to consider is carbon dioxide ($CO_2$) enrichment. $CO_2$ enrichment means injecting extra carbon dioxide gas into a greenhouse to boost the growth and production of crops. $CO_2$ is often produced by combustion of natural gas. In view of the energy woes, growers want to know what the true benefits are of $CO_2$, what quantities of $CO_2$ are required for certain conditions, if there are alternative $CO_2$ sources available and what $CO_2$ price is justifiable.

There are no simple answers. This article hopes to address some of these questions and provide an estimate of how much $CO_2$ your greenhouse operation may need.

### Ambient $CO_2$ concentration

Carbon dioxide is a colourless gas and a natural component of air. Currently the average concentration of atmospheric $CO_2$ is approximately 415 parts per million (ppm), which equals 415 millilitres per $m^3$ of air or 0.0415%. The $CO_2$ concentration has risen by about a third since 1950 (315 ppm), which is regarded as one of the key factors behind global warming and climate change.

### $CO_2$ from natural gas

Combustion of natural gas produces flue gases that are high in $CO_2$ and virtually free of impurities, providing the burner is working properly. However, it is far from ideal that $CO_2$ and heat are produced at the same time yet are required at different times. This problem can be partly resolved by using a heat buffer: gas is burned during the day for $CO_2$ and the heat that is produced at the same time is stored in the buffer and released the following night. Many large and medium greenhouse operations are on natural gas and use a large heat buffer. The very core of their greenhouse operation is in jeopardy if the gas price doubles and if gas is not available in the future.

A standard minimum supply rate is considered 50 kilograms per hectare, per hour (50 kg/ha/hour, which equals 5 g/$m^2$/hour). This requires the boiler to burn about 25$m^3$ of natural gas per hectare per hour or nearly 1 GigaJoule/hectare/hour (1 GJ/ha/h). Depending on the conditions, the chosen injection rate is often four to six times the standard amount – sometimes more.

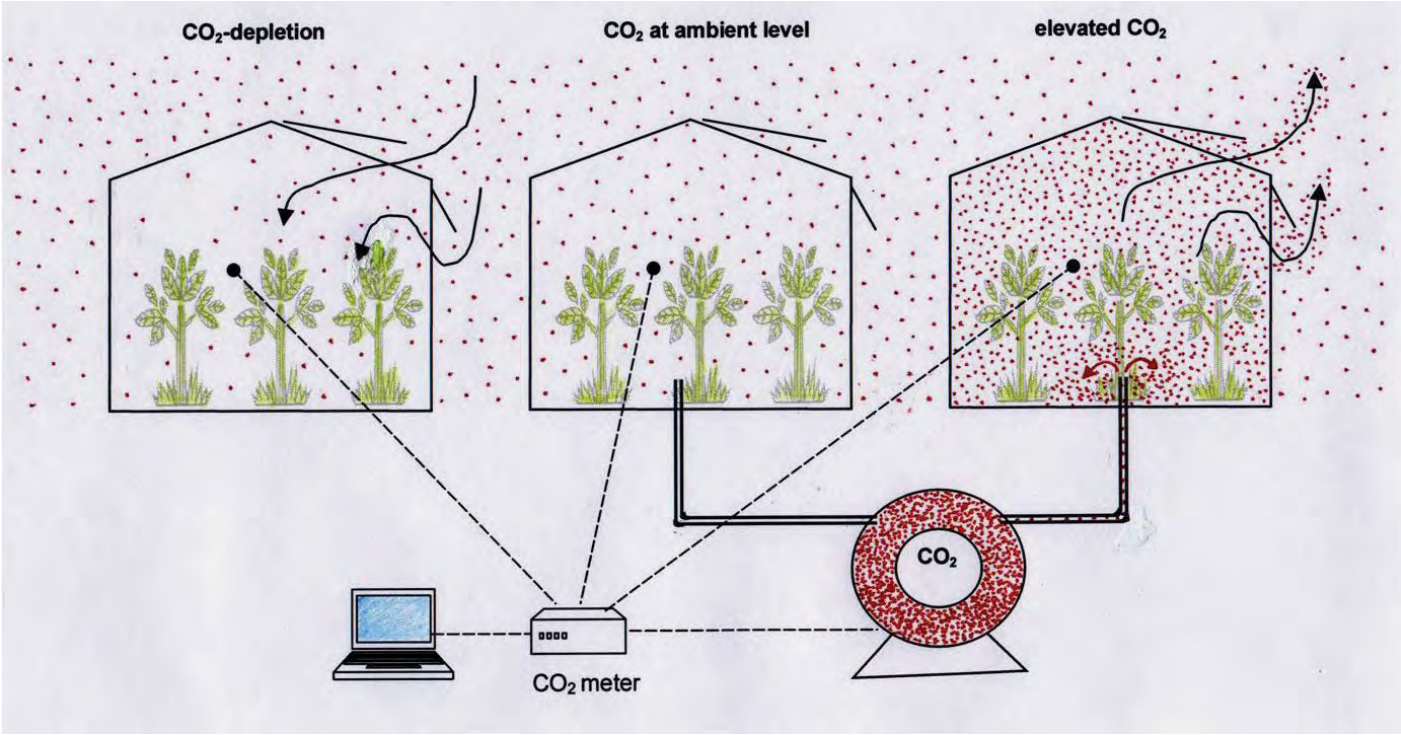



***Figure 1:*** *Three situations:* ***Left:*** *$CO_2$ depletion ($CO_2$ below ambient level) – $CO_2$ uptake very low, but no $CO_2$ loss.* ***Centre:*** *$CO_2$ inside the same as outside – low to moderate $CO_2$ uptake, also no $CO_2$ loss by ventilation* ***Right:*** *$CO_2$ enrichment to elevate the $CO_2$ level – very high $CO_2$ uptake, but also $CO_2$ lost by ventilation*

This requires that the burner is fully adjustable and controlled, so that it burns the amount of gas needed for $CO_2$ or heating or both.

### Alternative fuels for $CO_2$

Alternative sources of $CO_2$ have been sought for decades, as many growers (e.g. on the South Island) had no access to natural gas. To date, no alternative that fits the quality and affordability requirements for $CO_2$ enrichment has been identified. There are other fuels that are suitable for $CO_2$ enrichment though, including propane, butane, premium kerosene (paraffin), low-sulphur oil and LPG. These fuels are rarely used in large-scale greenhouse operations, for different technical or practical reasons. Of course, all fuels will be subject to increasing carbon emission costs, so they offer no respite.

Coal, wood products and heavy oil, when burned, do not produce suitable $CO_2$. Their flue gases contain dangerous compounds that cause severe damage to plants (and possibly harm humans too). Wood-based fuels also have the disadvantage of an inconsistent composition, making it difficult to maintain the right fuel-to-air ratio.

### Hot Lime Labs system

A promising development is underway whereby waste wood biomass (wood and crop) is burnt in a low oxygen environment in a gasifier to produce clean $CO_2$-rich gas. Patented limestone pellets temporarily fix the $CO_2$ within a Hot Lime reactor and can be released on demand into a greenhouse.

New Zealand company, Hot Lime Labs, has developed and tested their system successfully at pilot scale and are now building the first commercial unit.

### Pure/liquid $CO_2$

Overseas, exhaust gas from heavy industries is a core source of $CO_2$. By undergoing an expensive purification process, it is transformed into nearly 100% pure $CO_2$. It can then be pumped via a network of pipes or delivered by a road truck. The $CO_2$ must be of horticultural quality, which differs from medical or food grade $CO_2$. In New Zealand, pure or liquid $CO_2$ from industrial sources is available, but it is generally too expensive for most greenhouse cultivations.

### $CO_2$-uptake / photosynthesis

Plants exposed to (sun)light absorb $CO_2$, transforming it into sugars and ultimately, into new plant tissue. This process is called photosynthesis, or $CO_2$ assimilation. For every kilogram of $CO_2$ fixated by a plant, approximately 10 kilograms of new plant material is produced. In mature tomato plants, for example, 80% of this (i.e. 8 kg) ends up in fruit and the remaining 20% make up the leaves, stems and roots. Note that this is the percentage of $CO_2$ absorbed, not the percentage of $CO_2$ that is injected into the greenhouse. Photosynthesis requires light, therefore $CO_2$ enrichment at night is pointless unless lighting is being used. In darkness, plants respire (burn sugars) and emit $CO_2$, causing the $CO_2$ concentration to rise above ambient levels overnight – especially if the vents are closed.

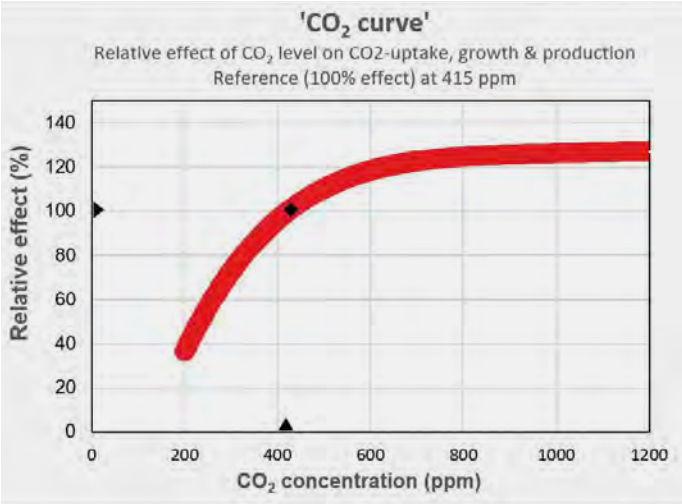



***Figure 2:*** *The $CO_2$ curve shows the relative photosynthesis and crop production (in %) at various levels of $CO_2$ (in ppm). The wide band accounts for the variation in response for various crops and various conditions*

### $CO_2$ depletion

During cold winter days with no ventilation, there is little fresh air coming in. When sunny, $CO_2$ is consumed and not replenished by inflow of fresh air. This can lead to a drop in $CO_2$ concentration, even below the outside concentration. This is called $CO_2$ depletion (Figure 1).

Low $CO_2$ levels hamper the plant's uptake of the gas. If $CO_2$ is injected during $CO_2$ depletion, the level will rise and so too will the $CO_2$ uptake. As long as the $CO_2$ level inside the greenhouse is lower or equal to the outside $CO_2$ level, there is no $CO_2$ loss. Therefore, all $CO_2$ injected ends up being absorbed by the plants (100% uptake).

### The '$CO_2$ curve'

$CO_2$ enrichment stimulates plant growth, resulting in bigger leaves, branches, flowers, fruit and also higher yield. Figure 2 depicts the relative production versus the $CO_2$ concentration – known as the '$CO_2$ curve'. The $CO_2$ curve has a wide band, because it is based on many experiments with a range of crops. For instance, at 900 pm some crops gave a 20% increase in production, while others gave a 30% increase – hence the wide band.

At a very low $CO_2$ level (e.g. 200 ppm), photosynthesis and plant growth are nearly zero. Lifting the $CO_2$ concentration from 200 to 300 ppm gives an enormous boost to the photosynthesis and growth. A further lift from 300 to 400 ppm provides another large jump in photosynthesis. Every further increment in $CO_2$ concentration increases the photosynthesis further, but not as much. The effect $CO_2$ has on photosynthesis gradually lessens at higher $CO_2$ levels. By 1000 ppm, the effect of adding $CO_2$ gradually plateaus, and beyond about 1,100 ppm, there is almost no benefit to the plant in adding more $CO_2$.

| $CO_2$ concentration → | 200 ppm | 350 ppm | 415 ppm | 500 ppm | 900 ppm |
|---|---|---|---|---|---|
| **without ventilation:** | | | | | |
| $CO_2$ uptake by plants ($g/m^2/h$) | 0 - 3 | 2 - 5 | 2.5 - 5.5 | 3 - 6 | 4 - 8 |
| $CO_2$ loss by leak ($g/m^2/h$) | 0* | 0* | 0* | 2 - 3 | 3 - 5 |
| $CO_2$ supply rate ($g/m^2/h$ | 0 - 3 | 2 - 5 | 2.5 – 5.5 | 5 - 9 | 7 - 13 |
| **With little venting:** | | | | | |
| $CO_2$ uptake by plants ($g/m^2/h$) | 0 - 3 | 2 - 5 | 2.5 - 5.5 | 3 - 6 | 4 - 8 |
| $CO_2$ loss by little venting ($g/m^2/h$) | 0* | 0* | 0* | 10 - 20+ | 15 – 50+ |
| $CO_2$ supply rate ($g/m^2/h$) | 0 - 3 | 2 - 5 | 2.5 – 5.5 | 13 - 26+ | 19 – 58+ |
| **With ample venting:** | | | | | |
| $CO_2$ uptake by plants ($g/m^2/h$) | 0 - 3 | 2 - 5 | 2.5 - 5.5 | 3 - 6 | 4 - 8 |
| $CO_2$ loss ample venting ($g/m^2/h$) | 0* | 0* | 0* | 25+ | 50+ |
| $CO_2$ supply rate ($g/m^2/h$) | 0 - 3 | 2 - 5 | 2.5 - 5.5 | 28 - 31+ | 54 - 58+ |

***Table 1:*** *Ballpark estimates for $CO_2$ uptake, $CO_2$ loss and $CO_2$ supply at various $CO_2$ lev, either with closed vents, or with a little or ample ventilation. For comparison: 1 gram/$m^2$/hour equals 10 kg/hectare/hour. This is roughly 0.5 $m^3$ of natural gas per hectare per hour or nearly 0.5 GigaJoule/hectare/hour (0.5 GJ/ha/h)*

## Photosynthesis or production

The $CO_2$ curve is similar for photosynthesis and production. Photosynthesis responds immediately to elevated $CO_2$, but the production takes a lot longer to show. In tomatoes, the yield is the result of photosynthesis over many weeks while the fruit grow. If $CO_2$ enrichment is only applied at specific times, e.g., only early in the morning, or for certain weeks of the month, then the effect on production is proportionally smaller than what the $CO_2$ curve anticipates.

## Optimum $CO_2$ level

Lifting the $CO_2$ concentration comes with some risk, such as accumulation of noxious gases that can be present in small amounts in the flue gases from burning natural gas. There is also the effect that high $CO_2$ slightly closes the stomata (pores in the leaves). Further, there are costs associated with high $CO_2$ concentrations. Therefore, it is not recommended to raise the $CO_2$ concentration unnecessarily high.

A level as high as 1000 ppm is only useful in good conditions – healthy producing plants, good light, low ventilation rate, cheap $CO_2$ and favourable produce prices. In less favourable conditions, such as poor light or expensive $CO_2$, the target level should be modest – 600 or 500 ppm.

This would reap easy benefits, while keeping costs down. Oversupplying $CO_2$ can be prevented by using the computer settings well. For instance, let the target level automatically decline with wider vent opening. Or fix the $CO_2$injection rate at say, 60 kg/ha/hour permanently. Or limit the $CO_2$ injection rate at 25 kg/ha/hour when vent opening is at 25% or more. In these latter examples, the $CO_2$ concentration is not set, but will depend on the conditions.

## $CO_2$ enrichment in figures

When $CO_2$ enrichment is reviewed, greenhouse operators want to know how much $CO_2$ is needed in various seasons. This depends on so many factors, but we give some indications in the table. The $CO_2$ demand equals the $CO_2$ uptake by the plants, plus the amount of $CO_2$ lost by venting. The latter ($CO_2$ loss) depends on the ventilation rate and can be multiple times more than the $CO_2$ uptake. On an annual basis, the amount of $CO_2$ injected varies greatly. An absolute minimum would be 3 kg/$m^2$/year (mostly restricted to winter), while a fairly ample supply will easily use 25 kg/$m^2$/year or much more. For comparison: $CO_2$ enrichment of 1 g/$m^2$/hour equals 10 kg/ha/hour. This is roughly 0.5 $m^3$ of natural gas per hectare per hour, or nearly 0.5 GigaJoule/hectare/hour (0.5 GJ/ha/h).

# NEW CODE OF PRACTICE FOR VEGETATED BUFFER STRIPS

Words by Henry Stenning and Andrew Barber : Agrilink NZ


*Left: The new vegetated buffer strips Code of Practice*

## Codes of Practice (COP) form a key component in the vegetable industries' continuous improvement strategy, *Joining the Dots.*

They incorporate industry and scientific research, and practical grower experience, into a condensed summary that acts as a guide for growers when implementing management practices. Guidelines and COP inform planning and effective implementation.

Codes of Practice are also the foundation of Farm Environment Plans, and many practices listed in the NZGAP (Good Agricultural Practice) Export Marketing Strategy are linked to industry-developed COP.

The latest COP released by the Vegetable Research & Innovation Board (VR&I) is on vegetated buffer strips. It includes the effect these buffer strips have on contaminant run-off, and the practices necessary to implement and maintain them correctly.

Vegetated buffer strips, also referred to as filter strips and riparian buffers (if next to a waterway), are a sediment mitigation measure for flatter cropping land. The use of these buffer strips is expected to increase as a result of the rollout of Farm Environment Plans (FEPs) throughout the industry.

Buffer strips are one tool in the toolbox of measures to help control sediment loss from cropping land. However, they work at the end of the sediment control chain (along with Sediment Retention Ponds and decanting earth bunds) by reducing the volume of sediment that leaves the land in run-off water and ends up in drains and waterways. There are many practises before reaching this point, including erosion control measures like interception drains, cover crops and wheel track ripping.

Sediment, particularly suspended sediment can have major, adverse effects on the freshwater ecosystem. The resultant increased turbidity of the water smothers

*A well flattened and graded zone prior to seeding with grass. Land shaping in this manner will promote sheet flow of run-off over the entire buffer and minimise the formation of channels*

habitats and kills aquatic life, whilst the attached particles of phosphorous and other nutrients promote eutrophication and the proliferation of algal blooms.

Buffer strips act to intercept run-off water at the final point before it enters farm drains or otherwise leaves the property. The undisturbed, uncompacted and improved soil structure within the strip increases the water infiltration rate, filtering out suspended particles as they pass through the soil profile. This is the main mechanism of sediment control along with capturing larger bedload particles that become deposited within the strip from the filtering effect of the above ground vegetation and reduced water velocity.

> **Buffer strips act to intercept run-off water at the final point before it enters farm drains or otherwise leaves the property**

While a relatively simple mitigation tool, correct implementation and maintenance of buffer strips is necessary to ensure their effectiveness. Small variabilities in ground contour, vegetation establishment, or soil build-up on buffer margins can result in a buffer strip that acts only to take up land, and not one that reduces contaminant load escaping the property in run-off water.

This occurs primarily due to the formation of channelised flow. This is where run-off water finds the path of least resistance, potentially leading to most, if not all, of a paddock's run-off bypassing or cutting through the strip altogether.

Therefore, a proper understanding of the initial setup (to encourage sheet flow across the width of the buffer) and correct maintenance of a buffer strip (minimising the formation of channels or bunds along the margin) is essential for correct functioning. All of these details are included in the new COP.


***Figure 1:*** *Continuous improvement in the horticulture industry.*

*The same buffer now fully established*

The buffer strip COP includes links to the NZGAP Environment Management System (EMS), prompting growers to think about their environmental action plans and how specific mitigations such as buffer strips may fit into them.

The COP also links to the *Don't Muddy the Water Erosion Rate Calculator*, a web app hosted on the VR&I website that enables growers to model their paddock erosion rates, with options for a variety of mitigation measures including vegetated buffer strips. Results from the calculator app can then be used as part of farm planning by enabling growers to prioritise mitigations based on modelled erosion rates from each of their paddocks.

The COP on buffer strips forms part of a larger review of guidelines which is currently underway. This review will update the content and design of previous guidelines. A roadmap for future guidelines will also be created. In addition, timeframes will be put in place for the review and update of all existing guidelines to ensure their continued relevance.


Keep an eye out for the latest developments by looking on the Grower Resources page of the VR&I, Horticulture NZ and NZGAP websites.

**www.vri.org.nz/environmental-resources/**

**www.hortnz.co.nz/compliance/grower-resources/**

# GROWER NITROGEN FERTILISER PRACTICES: SUSTAINABLE VEGETABLE SYSTEMS BASELINE FINDINGS

Words by Gemma Carroll : Potatoes NZ Inc. communications & engagement officer

**Social research provider, FOLKL, was recently contracted by The Sustainable Vegetable Systems (SVS) project to canvass grower opinions and needs and ensure they are central to the outcomes of the programme.**

The following outline highlights insights from this baseline survey.

### The three goals of the research:

- Determine the level of nitrogen (N) leaching problem recognition among growers
- Quantify the current level of key fertiliser management practices
- Identify the barriers to change.

### What has the baseline survey told us?

- Nutrient management is the second highest concern in day-to-day operations, behind profitability.
- 57% of growers believe that nitrogen leaching has a significant impact on the environment.
- 46% of growers believe they have a clear picture of nitrogen loss.
- Fertiliser use is predominantly the grower's own knowledge (58%), with fertiliser reps the second most common knowledge source. Other growers, codes of practice, industry material and workshops were all cited by less than 20% of growers.
- Growers are not entirely convinced about the practical realities of reducing N leaching.
- Growers who do acknowledge its impact on the environment are more engaged in a solution.
- Of growers who believe reductions are possible, over half (57%) believe reductions of up to 20% are possible. However, the tools or methods to achieve those reductions are not clear-cut.
- The biggest barrier to reducing nitrogen loss is fear of reduced marketable yield (43%) followed by access to the right tools and testing (29%). That is where SVS fits right in!

### Further insights and questions

**Nutrient management ranks highly among vegetable growers and is a key aspect of their day-to-day operations**

Growers are aware of the importance of managing nitrogen leaching to protect both the environment and their industry, but many growers are unsure about the impact that nitrogen leaching has on the environment. The survey found a clear correlation between environmental concerns and mitigation action.

> "Many growers are unsure about the impact that nitrogen leaching has on the environment

**The perception of nitrogen's environmental impact**

Initially, 57% of growers strongly agreed that nitrogen leaching has a significant impact on the environment. Digging deeper about the magnitude of impact, it was found that many growers sat on the fence, with 54% saying the environmental impact was neutral to high and 37% sticking with their opinion that nitrogen leaching had a significant impact.

**Influencing management practices**

When it comes to getting fertiliser advice growers are largely reliant on their own knowledge or that of a fertiliser rep. Eight out of ten growers measure soil nitrogen, however, the frequency of this is variable. Forty percent of surveyed growers are using their own nutrient budgeting tools, with OverseerFM being the second most used tool.

> "When it comes to getting fertiliser advice growers are largely reliant on their own knowledge

**It is clear that guidance on the type of soil nitrogen tests, their handling, and frequency of use would be beneficial**

Soil testing is carried out by more than half of all growers at least once a year, and most of these growers are testing two or more fields. Those who are not measuring nitrogen feel that it is either too complicated or difficult, or have not recognised or been convinced that a need exists to measure nitrogen in their operation.

### Nitrogen loss mitigation

There is a clear link between a grower's acknowledgement of the impact of nitrogen leaching on the environment and positive intent to address the issue in their own operation. Nitrogen loss management strategies vary widely and some growers have never used them at all.

Calibration of spreaders and side dressing are the most used management techniques currently.

Growers have diverse views on the most impactful ways to reduce nitrogen loss. This presents an opportunity to refine and identify the most effective strategies.

### How much reduction is possible?

Approximately one in two growers who feel nitrogen loss reduction is possible believe they can reduce their own levels by up to 20%, however one in four are unclear on what is achievable.

### What are the barriers to reducing N leaching?

- Fear of lower yields (cited by 43% of growers).
- Not having access to suitable tools that they can rely upon (29%). **SVS can help with this.**
- Access to land and natural resources (22%).
- Lack of knowledge (20%).
- Cost (19%).

**BARRIERS INCLUDE:**

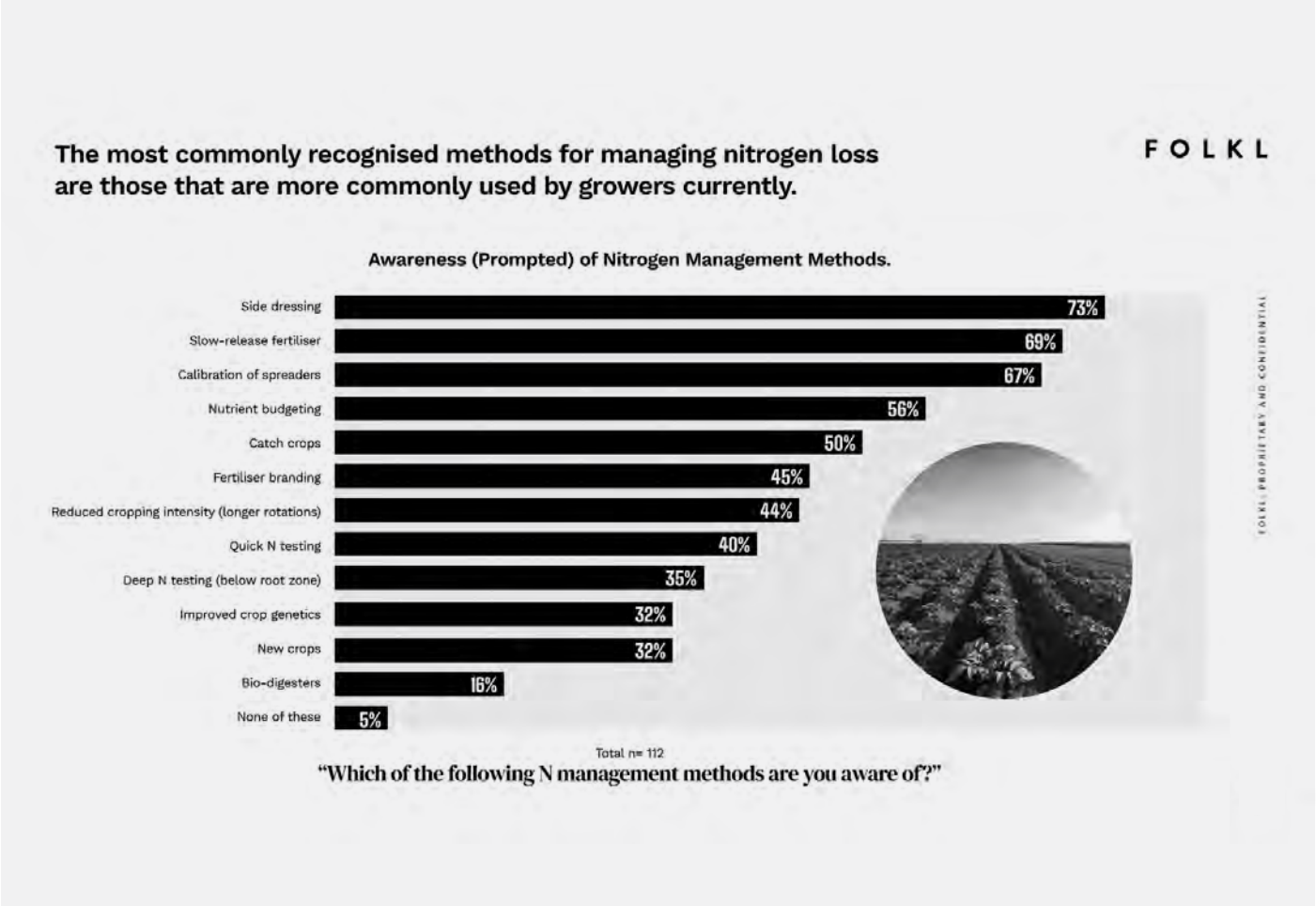
**43%** FEAR OF LOWER YIELDS

**29%** ACCESS TO SUITABLE TOOLS

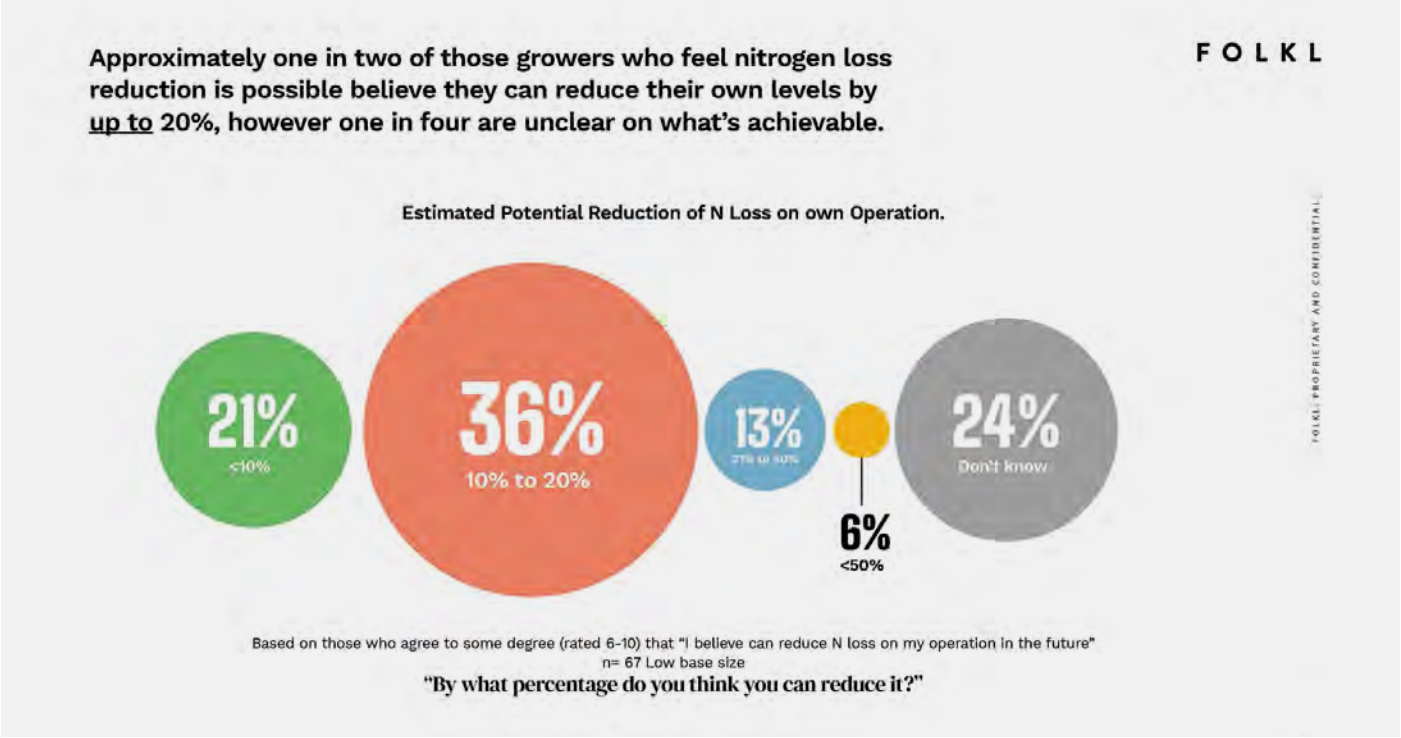
**22%** ACCESS TO LAND AND NATURAL RESOURCES

**20%** LACK OF KNOWLEDGE

**19%** COST




*Awareness of the most commonly recognised methods for managing nitrogen loss*




### Opportunities arising from this baseline survey:

- Research can build on growers' current tools and experience to gain an understanding of the rationale for a particular approach.
- Further exploration of the perceptions of existing tools.
- Work is needed to understand the barriers to increased testing.
- Tapping into the wealth of views on the most impactful ways to reduce nitrogen leaching within the grower community could help steer the sector towards the most effective strategies.

### Next steps for SVS

There are a range of opportunities for further investigation (qualitative research).

Plant & Food Research will be conducting further grower interviews to flesh out what growers' own methods look like and gain an understanding of the rationale for using those methods. It will also be useful to explore perceptions of the different tools available, and any future intent to use them.

Currently growers who are not measuring nitrogen within soil testing regimes feel it is either too complicated, too difficult, or have not recognised or been convinced that a need exists on their farm. Qualitative research by Plant & Food Research will explore the issues growers have around nitrogen testing in greater depth.

Growers have diverse views on the most impactful ways to reduce nitrogen loss, which presents an opportunity to refine the landscape of nutrient management and inform growers of the most effective strategies. Qualitative research may also delve into the beliefs growers hold on various management practices and help in highlighting how this may differ by farm type. This information can then be used to develop grower communications and grower-facing tools.

Some growers are resistant to reducing their nitrogen loss and are less likely to be completing the associated processes such as soil testing, despite acknowledging the serious effects it has on the environment. Further qualitative research may uncover the underlying drivers behind this to then engage more growers on the issue.

### SVS project goals

- Reduce the impact of crop farming on the environment and water quality while maintaining grower licence to operate through national, regional and farm programmes.
- Enhance the vegetable sector's ability to grow, process and export products, while meeting environmental standards and maintaining international competitiveness.
- Maintain social licence to operate for vegetable growers and industries.

This article was composed using edited extracts from the SVS Grower Baseline Report (FOKL research). Read the full report here: **potatoesnz.co.nz/rd-project/emissions-project/**

Ministry for Primary Industries Manatū Ahu Matua
Potatoes New Zealand
Vegetable Research + Innovation
Horticulture New Zealand
Plant & Food Research
SUSTAINABLE VEGETABLE SYSTEMS
FOLKL

# **PRODUCT** GROUPS

**ALL THE LATEST NEWS FROM YOUR PRODUCT GROUPS**

# INDUSTRY RESEARCH COMMITMENT AND OPERATING WITH COVID-19

Words by Richard Palmer : Process Vegetables New Zealand general manager

**The last Process Vegetables New Zealand (PVNZ) Board meeting provided a great insight into the issues facing our sector, and I thought it worth updating *NZGrower* readers on a few. The discussion was useful and has supported a substantial research commitment that will benefit growers.**

The projects we are committing to include:

- Continued work on soil assessment pre-plant and post-harvest to give guidance to nutrient need (for Overseer or its successor)
- Continued pea seed variability project (third year)
- A project with Plant & Food Research Ltd to identify cold tolerant Rhizobia, which would benefit early season peas
- Looking at slug control options, together with the Foundation for Arable Research
- Exploring new agrichemical/biological control options for beans, under *A Lighter Touch*.

Biosecurity has continued to be a large part of our work with the renegotiation of the Fruit Fly Operational Agreement (FFOA), closing out the Tomato Brown Rugose Fruit Virus response (successful eradication) and the transition to long-term management for Pepino Mosaic Virus (PepMV).

While the FFOA is taking considerable time, industry parties and the Ministry for Primary Industries (MPI) have shown strong commitment to progress. In the background, Government Industry Agreement (GIA) partners are reviewing the GIA Deed and providing input to the long-awaited review of the Biosecurity Act.

Lastly, I am pleased to report that the Pea Weevil response in the Wairarapa, a project in which I was involved with the late John Seymour, has been closed out with successful eradication of Pea Weevil. I am sure John would be very pleased with this result, which is a reflection of his work for our sector. My thanks goes to MPI and the others involved for the great execution and successful outcome.

The effects of Covid-19 are far from over, with some greater risks apparent as New Zealand transitions from elimination. There are a number of Covid-related matters that we continue to advocate on, including potential market access issues; also, the ability of workplaces to require vaccination of their workers, both as a health and safety matter and to minimise market access and reputational risks.

> **“ I am pleased to report that the Pea Weevil response in the Wairarapa, a project in which I was involved with the late John Seymour, has been closed out with successful eradication of Pea Weevil**

While we continue to advocate for a government approach that supports employers to require vaccination, or at least ask employees for their vaccination status, we strongly encourage all employers to have a process in place to consider both the health and safety risks and encourage and support people to get vaccinated.

I know many have already made great efforts around vaccination, which is a tremendous contribution to New Zealand’s recovery.

# SUPPLY OF CROP INPUTS – PLAN WELL IN ADVANCE

Words by Helen Barnes : TomatoesNZ Inc. general manager


**TomatoesNZ recommends that all growers talk with their suppliers as soon as possible to plan for their raw materials requirements well in advance, taking a nine to twelve-month view. Consider all the inputs you need for a successful crop – seeds, substrates, fertilisers, etc.**

As an industry, we rely on using good quality raw materials, many of which are imported. Growers will be aware there has been a steady increase in lead-times for supply of key greenhouse inputs over the past year, which is likely to continue for a year or two, mainly due to the impact of Covid-19 restrictions on the supply chain and operations.

Availability of sea and air freight, have been curtailed and costs have increased significantly. Global shipping reliability is now at an all-time low and there are reduced services into New Zealand.

Fuel and labour shortages are negatively impacting day-to-day business operations worldwide, and prices have increased as the freight market passes on the extra costs. For example, shipping charges have more than tripled, and inland handling charges increased by more than two-fold, with shipping lead-times extending from eight to ten weeks previously, to approximately six months now.

**Please:**

- **Forecast and forward plan the inputs you need for your crop life (at least 6 months in advance).**
- **Talk with your suppliers to get their advice.**
- **Place forward orders to secure supply of key raw materials needed for the crop season.**
- **Plan for varieties and other long-term requirements early.**


***Figure 1:*** *The Climate Change Response Act sets out tools for the transition (the Zero Carbon Framework)*

## Government consulting on emissions reduction plan

Public consultation on the government's discussion document, *Transitioning to a low-emissions and climate-resilient future – discussion document for an emissions reduction plan*, opened in mid-October and runs until 24th November 2021. This will inform the first Emissions Reduction Plan, to be announced in May 2022. This plan will set the direction for climate action for the next 15 years, and will include policies and strategies for specific sectors, including transport, energy, and waste. The government has committed to all greenhouse gases, other than biogenic methane, reaching net zero by 2050. The emissions reduction plan is one of the tools (Fig. 1) that will be used to reach that goal.

TomatoesNZ plans to make a submission with HortNZ and Vegetables New Zealand Inc. We welcome your input.

Key areas for input include:

- Emissions Trading Scheme price settings.
- Funding for research and technology development to lower emissions in greenhouse growing systems.
- Funding support for low-emission transition and energy efficiency improvements.
- Development of an energy strategy and pathway to manage fossil fuel reduction, access to affordable low-emissions energy and emission targets.
- How government can best support biofuel options development and supply

## Emissions Trading Scheme prices surge

In early October, we wrote a joint letter with Vegetables NZ to Hon James Shaw, Minister of Climate Change and Associate Minister for the Environment, expressing our concern on the impact the rapidly rising Emissions Trading Scheme (ETS) unit price will have on New Zealand's food security, and requesting a meeting.

The ETS price has more than doubled this year hitting growers hard on the back of other rising costs. In our letter we proposed the government consider direct investment support for capital costs, such as long-term co-investment with industry, access to low-cost loans, and rebates on ETS expenditure.

We also proposed an exemption from ETS costs (or allocation) which aligns to the 95% allocation provided for the rest of the agriculture sector under He Waka Eke Noa on the basis that there is not widely feasible technology or mitigation available for greenhouse growers.

## Pepino Mosaic Virus update

The presence of Pepino Mosiac Virus (PepMV) at a further South Auckland commercial tomato property was confirmed in September, taking the number of confirmed sites to five. These sites are all still able to sell fruit.

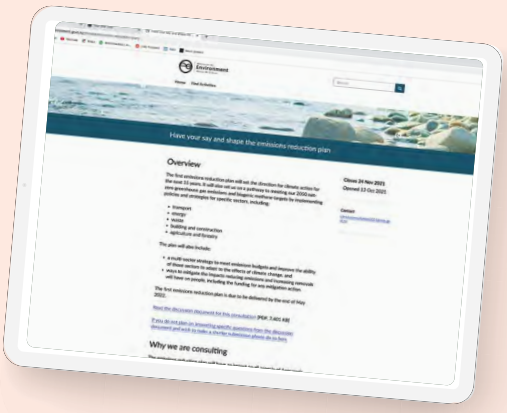
We are working with the Ministry for Primary Industries (MPI) on transition to a long-term management plan. Projects include:

- **Crate hygiene** – looking at potential to develop and implement a best practise hygiene standard for crates.

- **Irrigation water testing to detect PepMV** – a proposed MPI-led science project developing a method to detect PepMV and other pathogens in greenhouses, similar to the way Covid-19 is detected in wastewater.
- **Impact assessment** – for crops that have the virus in New Zealand.
- **Mild Strain Inoculation ('vaccine') for PepMV** – overseas this is one of the methods used to manage the virus. We are working through what regulatory process would be required to import the vaccine.
- **Nursery plant assurance** – adoption of a virus hygiene plan for tomato and capsicum nurseries.
- **Slowing the spread** – advice on keeping the virus out of greenhouses, removing the virus from an infected greenhouse, and preventing dispersal from infected greenhouses.
- **Surveillance & testing** – we're looking into providing growers with an industry-funded end of crop testing service.
- **Understanding and cataloguing the New Zealand variant.**
- **De-regulation** – PepMV is currently a notifiable, unwanted organism. Deregulation needs to be carefully considered as it has import implications (for seed) and export implications (for market access) that need to be weighed up carefully.
- **Export Market Access** – export access to Japan has re-opened, and work is underway on re-opening the important Australia and Pacific Islands export markets.

We will keep you informed on these steps as they progress but if you have any questions or comments, please get in touch with us.

The consultation document is available here: **consult.environment.govt.nz/climate/emissions-reduction-plan/**



# TEN YEARS OF PROACTIVE BIOSECURITY RISK MONITORING FOR VEGETABLE GROWERS

Words by Lisa Wong : Market Access Solutionz

**In 2010, the VR&I Board recognised the importance of monitoring pests and diseases that were having an impact overseas and could potentially enter New Zealand, affecting the vegetable industry.**

*Monitoring biosecurity risks for the vegetable and arable sectors* was introduced as a proactive approach for identifying and managing biosecurity risks that were a threat for vegetable growers. This project has been supported by the Board for ten years.

Vegetable growers have reaped significant benefits from the project, including:

- Supporting vegetable product groups to identify priority pests to alert growers to their risk.
- Supporting the vegetable sector and informing its work as a GIA (Government Industry Agreement) partner.
- Proactively notifying the Ministry for Primary Industries (MPI) of emerging pests and pathogens that threaten the industry so that import health standards can be amended with additional measures to manage import pathways.
- MPI establishing the Emerging Risks System for identifying and responding to new and emerging risks of biosecurity concern.

The project's monitoring consists of two parts:
One, monitoring new and emerging pests and diseases which are having an impact overseas.
Two, monitoring the pests that are being intercepted at New Zealand's border.

### Monitoring new and emerging pests and diseases

Through the project, significant changes in distribution and impacts have been observed for a number of key vegetable pests including fall armyworm and vegetable leafminers which are now established in Australia.

Fall armyworm (*Spodoptera frugiperda*) was first reported through the *Monitoring Biosecurity Risks* project in early 2017 having then recently spread to 12 African countries. Fast forward to 2021 and fall armyworm has rapidly spread eastwards across Africa, Asia, and now to Australia, where it has invaded and cannot be eradicated (Figure 1). New Zealand growers need to remain vigilant as an assessment by MPI predicts that fall armyworm could arrive in New Zealand from Australia via wind-assisted natural dispersal.

The risk of vegetable leafminers has also increased significantly for New Zealand growers as *Liriomyza sativae* (vegetable leafminer), *L. huidobrensis* (serpentine leafminer) and *L. trifolii* (American serpentine leafminer) are now present across the Tasman. The project reported the first detection of L. sativae in Australia in 2015, with Serpentine leafminer and American serpentine leafminer arriving in Australia in the last 12 months. The threat posed by leafminers has prompted MPI to urgently amend the fresh produce import health standard for vegetables imported from Australia.

Tomato viruses have also emerged as major risks in the last three or four years, with the emergence of Tomato brown rugose fruit virus (ToBRFV) particularly swift. This virus was first reported by the project in September 2018. MPI was notified and identified a risk on the seed for sowing pathway, with action taken to introduce emergency measures in February 2019. New Zealand growers need to be alert to the risks that affect their crops and seek information from their product groups so they can maintain awareness of their biosecurity risks.

### Monitoring pest interceptions at the border

Information on pest interceptions on the fresh produce pathways is supplied by MPI and reviewed annually to monitor the effectiveness of border measures and the level of compliance to import health standards by exporting countries.

Pest interceptions are monitored on the main commodity groups including alliums, brassica, solanaceae, cucurbitaceae, peas and beans. Imported cut flowers and foliage are also monitored as they can be a pathway for unwanted pests, such as chilli thrips (*Scirtothrips dorsalis*). Chilli thrips are highly invasive, cause feeding damage on a wide range of vegetable crops and are a priority pest for most vegetable product groups.

Interception rates across crops indicate that border performance is variable year-on-year. Interception rates for some crops have improved, others have not improved and in some cases, have deteriorated. The level of intercepted pests identified to species level is very low, meaning the ability to assess risks posed by specific pests is compromised.

The benefit of analysing interception data means that the sector can engage with MPI to work to improve border processes and import health standards.

The positive outcomes of this project demonstrate the value of continuing to monitor for new and emerging pests and pathogens that are having an impact across the globe and may pose a biosecurity risk to the New Zealand vegetable industry in future.

# TRANSITIONING THE NEW ZEALAND ONION INDUSTRY FROM HUMBLE TO HERO

Words by Brittany McCloy : Onions NZ Inc.

**Onions New Zealand and the Ministry for Primary Industries (MPI) have entered into a partnership under the Sustainable Food and Fibre Futures fund (SFFF). This will be the first sector accelerator partnership with the MPI.**

This partnership will invest in the differentiation and resiliency of New Zealand Onion exports over the next six years. Onions New Zealand would like to acknowledge the co-funding of $2.8 million committed by MPI.

### High Level detail

- Six-year research programme with joint industry-government funding, which started 1 July 2021
- $6.02 million investment over the life of the programme
- Three key themes of work which encompass ten workstreams
- Ultimate goal is greater market diversification for the industry and increased value from onions exported.

### What is 'Humble to Hero'?

This programme is made up of ten projects across the value chain. Together, they will be transformational for the onion industry. The projects fall within three themes:

A ***Market validation and diversification:*** Centred on identifying and opening up high-value export markets. This theme will reduce the industry's dependency on the European Union and Indonesia. This will involve gathering information on potential markets, gaining or improving regulatory access, developing and validating markets.

B ***Enabling value:*** Focusing on making the New Zealand onion sector more robust. This is the linchpin of our future market access. Acknowledging that globally, consumers and governments are demanding greater accountability from the food system. The projects in this theme will enhance the story of New Zealand onions with verifiable food safety credentials, robust industry information and understanding the industry's greenhouse gas emissions.

C ***Capturing value:*** Adding value to New Zealand onions by understanding consumer demands, identifying unique attributes, exploring options to reduce waste and telling the story of New Zealand onions.

> **The projects in this theme will enhance the story of New Zealand onions with verifiable food safety credentials, robust industry information and understanding the industry's greenhouse gas emissions**

### Who benefits from this work?

This research has been developed around industry input and participation and is designed to be industry-led and implemented. All 85 grower members and 20 exporter members will benefit from this programme of work, although impacts will vary depending on involvement, adoption and market orientation of production. Although this is an export-orientated research programme, the outcomes will create positive impacts for all growers, including but not limited to:

- Increased market access
- The ability to measure and report production level sustainability credentials to meet both domestic and international regulations and market requirements
- Developing and implementing an industry food safety assurance programme, which will be used to maintain market access offshore and meet growing compliance as an industry for domestic policy
- An all of industry review of current waste streams and what opportunities exist to minimise waste streams or create value from them.

### Overseeing the transition

Onions New Zealand has absorbed the programme management internally, with Brittany McCloy named programme manager. The partnership is governed by a joint MPI – Industry-specific Governances group, with three industry members (Kelvin Bezuidenhout, Guy Hilson and Tristan Balle), an MPI representative and independent chairman, Tony Ponder.

*The New Zealand onion sector currently exports approximately 200,000 metric tonnes per annum worth $150 million FOB. Onions are New Zealand's third most valuable horticulture export behind kiwifruit and apples. This programme of work will support further growth and resilience in export earnings.*

> **All 85 grower members and 20 exporter members will benefit from this programme of work, although impacts will vary depending on involvement, adoption and market orientation of production**

Potatoes™ NEW ZEALAND

# ALEX MCDONALD LTD – POWERED BY 80 YEARS OF POTATOES

Words by Kerry Hughes


## Established in 1941, Alex McDonald Ltd (Almac) will celebrate its 80th birthday this year.

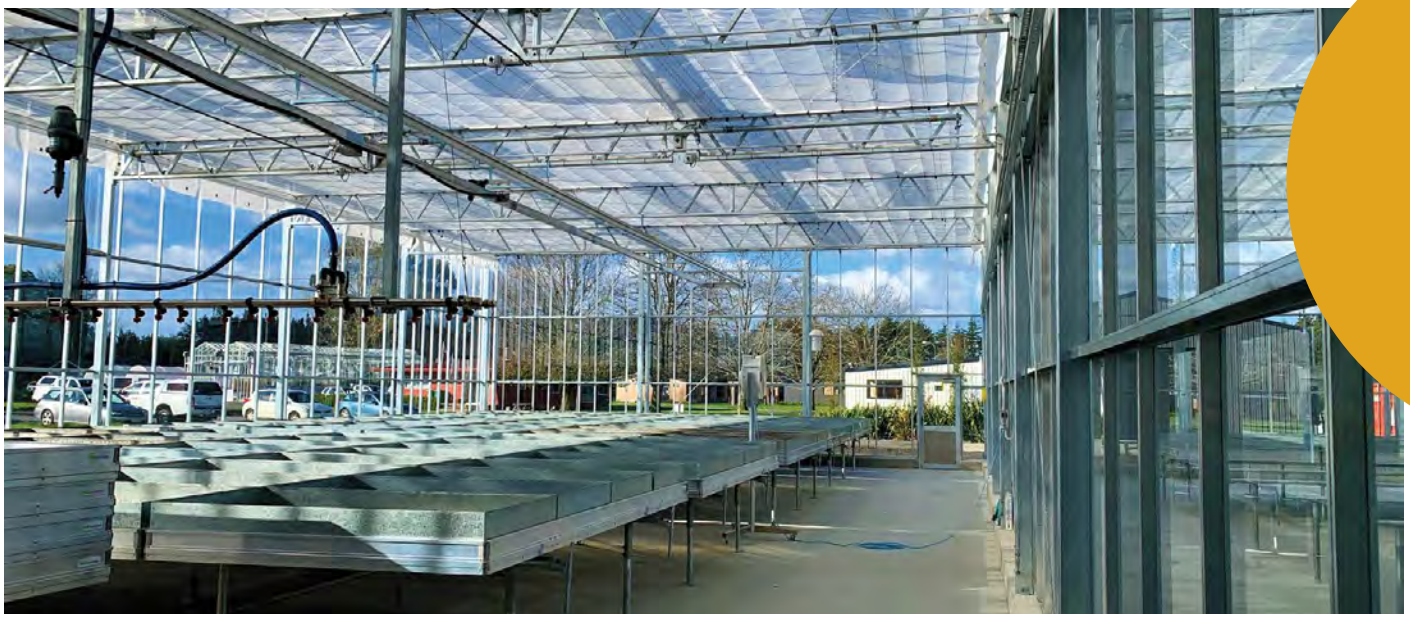
Although Almac has always traded in potatoes, it wasn't until the 1970s that Alex's sons, Colin and Alistair, established the Pathogen Tested (PT) Seed Potato Scheme in a joint venture with Pyper Produce and what was the Department of Scientific and Industrial Research (DSIR).

Colin took full ownership of the company when Alistair retired early and has overseen the quick development and growth of the seed scheme. The arrival of the smooth, white skinned variety of potato, Nadine, coincided nicely with the development of washing potatoes for retail sales. The Nadine variety dominated the washed market over the ensuing decades.

Colin, who celebrated his 90th birthday this June, eventually sold the business to Kerry and Antoinette Hughes, before his own retirement. Kerry has now worked for Almac for 27 years.

Today, Almac represents eight different European seed breeders from Germany, Holland and the United Kingdom – providing access to the latest varieties and technologies on offer. Biosecurity regulations mean that raw potatoes cannot be imported into New Zealand. Instead, they are brought in as micro plantlets – imported from a single laboratory in Scotland. When they arrive, the plantlets have already cleared quarantine and are ready to develop into mini tubers through the PT scheme and glasshouse facility. The mini tubers are field multiplied by Almac as growers, then passed on to contract seed growers throughout Canterbury for further multiplication, then finally to the end user-growers throughout New Zealand.

> "The Nadine variety dominated the washed market over the ensuing decades



*Inside Almac's new glasshouse facility*

After 45 years of having the PT Seed Scheme at Plant & Food Research Ltd in Lincoln, the joint venture has run its course and Almac have relocated to a brand-new glasshouse facility at the Innovation Park in Templeton, Christchurch. The purpose-built facility imported from Holland, will give the business more capacity to produce more mini tubers, and enable seed production at an earlier generation. Roading access delays have meant the intended opening for the glasshouse has not been possible yet.

Almac has developed solid relationships with seed growers and buyers which have supported the long-lasting business. The community includes second-generation clients and in some instances third-generation family members.

Credit is also due to Almac's employees, who have contributed to the business's ongoing success over its 80-year life. Long serving glasshouse manager, James Robertson, retired this year, after 37 years of work for Almac at the Plant & Food Research centre in Lincoln.

James held a vital role in the seed production pipeline, growing the tissue culture plantlets into mini tubers which were then planted by the field crew as generation zero. One year he had as many as 112 different lines in production.

> **"Almac represents eight different European seed breeders from Germany, Holland and the United Kingdom – providing access to the latest varieties and technologies on offer**

Almac would like to take this opportunity to thank everyone in the industry for their continued support.

# DRYGAIR PROMISES TO REDUCE GREENHOUSE ENERGY USAGE AMIDST RISING GAS COSTS

**It is no secret that energy prices have been soaring over the past months. This is a global issue that affects growers everywhere and is already impacting local greenhouse operators. With such high costs and uncertainty regarding future gas and electricity prices, it is critical for growers to increase energy efficiency and reduce usage wherever possible.**

DryGair, a leader in the field of greenhouse dehumidification, provides such a solution. Their system combines dehumidification, air circulation and a minor tweaking of greenhouse growing protocols, which has been proven to save an average of 50% on energy usage compared to traditional heating and ventilating.

### How DryGair Reduces Energy Usage and Minimises Greenhouse Carbon Footprint

Traditionally, growers remove moisture from the greenhouse environment by ventilating and heating. This method may be partly effective provided weather conditions are warm and relatively dry. The problems occur when weather is humid, rainy, or cold. Ventilating under these conditions means operators must constantly heat the greenhouse to make up for lost heat. This is one of the most widespread wasteful tactics used in horticulture, costing growers a lot of money in energy bills, and increasing their environmental footprint.

DryGair eliminates this unnecessary expense by providing powerful dehumidification inside the greenhouse. DryGair units extract water from the air at a rate of 45 litres per hour, under common greenhouse conditions of 80% RH (relative humidity) and 18°C. When it is hotter or more humid, extraction rates are even greater. This means growers can precisely and reliably control humidity without opening windows or vents. Without exchanging air with the outdoors and losing heat to the environment, greenhouse operators no longer need to constantly reheat the air.

In effect, using DryGair decouples heating from humidity control. The DryGair unit controls humidity from inside, and growers only need to heat when it is cold.

### Save 50% On Greenhouse Energy

Energy savings when using DryGair stem from the fact that growers drastically reduce their heating needs, replacing the energy used for heating with only 10 kW of electricity needed to operate the DryGair.

But energy savings are only one of the benefits DryGair provides to growers. Controlling humidity levels also ensures that plants grow under the most optimal conditions. This stimulates growth, promotes healthy crops, and ultimately leads to larger yields and higher quality.

These outcomes position DryGair at an average ROI (return on investment) of two to four years. This is a conservative calculation that doesn't take the recent increase in energy prices into consideration. It also disregards other benefits, such as the collection of reusable water (as much as 1,000 litres a day). Controlling humidity also prevents various diseases, such as botrytis, meaning that growers use much less pesticides and fungicides, with resulting cost savings.

During these turbulent times, reducing energy usage and increasing efficiency for the long run is crucial. The future of horticulture relies on the ability to constantly improve and reduce the inputs and environmental footprint needed to produce food and medicinal crops.

You can find out more by contacting Nathan at Advanced Hort at **sales@advancedhort.co.nz** or **0800 467 883**.

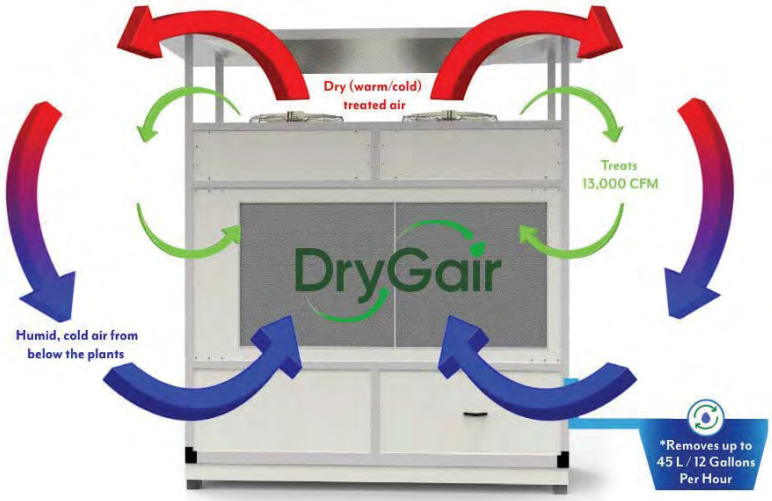
Advanced Hort
Your solution for growth

DryGair
World Leading Dehumidification Made For Plants

# DryGair Dehumidifiers

## Get Your Humidity Under Control

**50% energy savings** compared to traditional heating & venting.
Uniform climate conditions, **360° air flow distribution, up to 22,000 m³/hr**
**Prevent humidity diseases**, reduce the need for pesticides.




DryGair Energies Ltd. develop and market an efficient and environment-friendly dehumidification solution for horticultural projects.

Our wide selection of dehumidifiers in various configurations and sizes can fit any crop or growing facility. Including split units for dense greenhouses and added temperature control.

Ideal for integration into existing or new commercial greenhouses. Efficient large scale dehumidification with plug & play ease of use, and huge coverage area.

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Contact Us: 0800 467 883 | sales@advancedhort.co.nz | **www.drygair.com**

# QUALITY FOR EFFECTIVE SLUG CONTROL IN ALL GROWING PRACTICES

**Slug and snail damage is greatest in spring and autumn as activity increases with moist and humid conditions. The most widespread species is the grey field slug (*Deroceras reticulatum*) which causes extensive damage to establishing and vulnerable crops.**

This slug species reproduces quickly, with up to 1,500 eggs per year, peaking in spring and autumn but extending in a wet summer season. Grey field slugs can be active from 1°C to the optimum for their activity of 17°C. With this in mind and the current wet season, leaving slugs unchecked and not effectively controlled can have devasting impacts on crop yield and quality.

UPL New Zealand offers an effective metaldehyde-based slug and snail bait, METAREX INOV®. Produced by global leaders in bait formulation technology, De Sangosse, the quality and performance of METAREX INOV® is well known and has been utilised by growers for several seasons. Bringing further innovation and suitable for use in all crop situations, UPL's IRONMAX PRO® is a BioGro certified slug and snail bait now available to New Zealand growers. IRONMAX PRO® is a biorational molluscicide containing a low concentration of ferric phosphate, a natural component of soil, in a specially formulated bait. It is a great fit for conventional, organic or regenerative growing systems.

Both METAREX INOV® and IRONMAX PRO® have been formulated with De Sangosses's breakthrough technology, COLZACTIVE®. According to Scott Hanson, country


manager of UPL New Zealand, "It means those growers seeking a high-quality alternative to metaldehyde have a proven choice. COLZACTIVE® differentiates both molluscicides by providing the grower with various advantages above other slug baits.

"Successful control of your crop depends on product choice with the understanding of how pellet quality affects slug control. Slug pellets may look similar but there are differences between them that greatly influence performance," explains Scott. COLZACTIVE® in both METAREX INOV® and IRONMAX PRO® ensures consistently high performance by delivering a bait more attractive, more palatable and faster acting against slugs and snails. It renders the bait more attractive than the seedling, ensuring that the slug ingests enough of the active substance. This translates into a lower rate required to consistently achieve high efficacy.

De Sangosses's production is through a unique and optimised wet process which results in pellets of consistent size, shape, and density. Pellet dynamics are important for spreadability. Both METAREX INOV® and IRONMAX PRO® are all-weather slug and snail baits. They are rain fast, so the bait lasts longer in the field thereby protecting crops for a longer period.

Scott concludes with, "When choosing a bait ensure that the quality is foremost on the mind. It can be the difference between profit with crop success or loss with crop failure. Now all growers across New Zealand can effectively protect their crop with a high performing slug bait that suits their specific requirements."

For more information go to
**www.upl-ltd.com/nz**
or email **enquiry.nz@upl-ltd.com**

UPL OpenAg™

# NEW TOTAM SEEDS TOMATO VARIETIES AVAILABLE FOR TRIALS

**Totam Seeds was founded in 2010 by three growers in the Netherlands. Only four years later the largest Dutch growers' association 'Prominent' became the major shareholder, which meant no less than 35 tomato growers are involved in Totam's breeding business. Consequently the company can draw upon a wealth of accumulated practical knowledge about grower requirements as a foundation for the breeding programme.**

Since November 2020 Totam Seeds has been part of the Japanese company Mitsui & Co. In 2016 Mitsui & Co established the seed unit within the Nutrition and Agriculture division to provide products essential to the food and agriculture industries that are sustainably produced. This synergy allows the combination of resources, expertise and research and enables Totam Seeds to grow and maximise its business potential. The breeding options are expanding in view of the latest consumer trends. The strong research and development capabilities of Mitsui's seed ecosystem which also includes the company Top Seeds International Ltd, gives Totam Seeds the opportunity to develop new and innovative varieties.

Premier Seeds is the exclusive supplier of Totam Seeds in New Zealand and is delighted to introduce the latest trial varieties. Developing excellent relationships with their seed breeders and suppliers is important to Premier, which draws upon their valued knowledge and expertise when selecting new trial seed varieties suitable for the New Zealand climate.

Premier Seeds is currently focused on large truss, cocktail, and cherry tomatoes as well as tomato rootstock. Eventually the portfolio will extend to specialities. Premier Seeds is seeking improved fruit quality, firmness, internal fruit colour, and fruit taste to satisfy consumer demand, as well as high yield, balanced and vigorous varieties. A resistance package is also being developed to support New Zealand growers. All varieties have been successfully trialled in Holland and Prominent growers are sufficiently pleased with the results to progress these varieties to the semi-commercial phase.

These tomatoes are either currently available or will very soon be available:

- 3 large truss varieties with an average fruit weight (afw) of 155–175g and brix levels of 4.0 to 5.5.
- 3 cocktail varieties with an afw of 45–55g, brix levels of 5.5 to 6.9.
- 2 medium sized cherry varieties with afw 17–20g and brix levels of 7.5 to 9.
- 2 small cherry varieties with afw 12–14g and brix levels of 9 to 9.5.
- Tomato rootstock **TS100**. This rootstock was trialled against the two market leading rootstock varieties; **TS100** finished superbly with a production increase of 3.1%. Trial data from Holland is available on request.

Premier SEEDS LIMITED

TOTAM SEEDS

If you would like more information, variety files or trial seed, please contact:

Imke Blackett: **027 244 4611**
**imke.blackett@premierseeds.co.nz**

Benjamin Carrell: **027 244 465**
**benjamin.carrell@premierseeds.co.nz**

# NZFOAM TO THE RESCUE

**Heating is expensive. However, transforming an old or new shed into a dry, temperature-controlled, commercially viable building has proved possible with NZFoam.**

Spray polyurethane foam has been in New Zealand for 40 years and is the preferred insulation product globally. Foam's rediscovery and redevelopment came out of director Chris Haughey's frustration and dogged determination to find a solution for inefficient buildings, without the shortfalls of other products.

Along with Rob Leach and his crew, with headquarters in Canterbury and a hub in Auckland, the team service from Cape Reinga to Bluff, working with builders and architects for renovations and new builds.

Water and air tight, it keeps out all outside contaminants, is safe, environmentally sound and completely inert – with no off-gassing or formaldehyde. It's made from 22% renewable and recycled content including sustainable soy-based oil and plastic bottles.

"It is completely self-extinguishing. Data sheets and fire tests are incorporated as part of the CodeMark industry standard." Chris says.

NZFoam has one of the highest R-values on the market. Sprayed on, with no gaps or corners, it goes around any curve or corner, never moving or sagging over time. Foam can be also used on building exteriors, if painted, and under wooden floors in any ground condition – and is adhesive to concrete and steel.

*Rakaia Hub is a storage facility for potatoes, tulip bulbs etc*

*Lance Roper and Chris Haughey at the Roper & Son shed in Lincoln*

For David Waddy of Scargill in North Canterbury, NZFoam mitigated the expense of a new roof in his woolshed. With the water-tight, damp-proof solution, sheep now stay dry – even in extreme weather.

Nigel Reith of Rakaia Hub Potato Storage facilities says foam has economically transformed his business in regards to running costs and quality control.

> **Foam requires no maintenance and has a zero-lifecycle cost, lasting the life-time of the building**

Lance Roper's Selwyn onion farm now stores product onsite in a converted chicken shed, cutting costs, thanks to the temperature-controlled environment heated and cooled by NZFoam and Snow Temp air conditioning. And a Palmerston North deer shed produces half a tonne of fodder daily, with the NZFoam solution at the helm.

"Foam requires no maintenance and has a zero-lifecycle cost, lasting the life-time of the building."

"We confidently offer a 25-year plus guarantee for optimum performance and commit to bettering client expectations as to what spray foam insulation can achieve."

To learn more visit **www.convertmyshed.co.nz** or **www.nzfoam.co.nz**

**Classified advert rates**

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| **Quarter Page** | $435 | $420 | $395 | $355 |
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| **Cameo** (W40 x H65mm) | $145 | $140 | $135 | $125 |
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**1995 KORVAN 930 – TOW BEHIND**

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**Excellent condition, shed stored**
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ENZA ZADEN

Herman van der Gulik, sales manager, doing a welfare check on leafy crops before field days.

## Get upclose and personal (with the crops) at our Leafy Field Days

**All growers are invited to our Leafy Field Days from 30 November to 3 December. Please save the date.**

We have new and commercial varieties in the field for iceberg, cos, and other leafy lettuce, along with our full mildew resistant spinach. Contact Bev on 021 191 008 to make an appointment to view the field day. The field day will meet all government physical distancing, masking and other covid level requirements. If you are unable to physically attend we can arrange to meet online. The crop is being given all the best possible love at the moment. We will confirm timing one week before.

# We'll get you covered in great crops...

Enza Zaden covers New Zealand and the world with the best of leafy and fruity crops. Talk to us to get the most out of your indoor crops (and outdoor crops too). Discover the most productive green frill lettuce (Wildebeast), the most beautiful bright yellow capsicum (Solaste), the fastest ripening, highest yielding red capsicum (Margarethe), the most fragrant petite basil (Piccolino) and the most consistent, sweet tasting tomato (Avalantino). Contact Aneil on 021 367 242, Bev on 021 191 008, Louise on 021 711 709, or Herman on 021 858 939 to find out more.

We live in exciting times and we appreciate the support we have from growers. Our way of living has changed so much in the last 18 months, who knew our children would be home schooled, we could be locked down at a moments notice and we would have to innovate so much faster than before. All of us at Enza Zaden are so proud of the way growers have adapted, innovated, stretched, intensified and changed market focus. You have tackled this with integrity and amazing resilience, all while managing challenging environmental demands and logistics with a smaller available workforce. Few consumers appreciate the amazing work growers do to realise the potential of a seed, turning it into fresh vegetables, that are available every day in a wide range of tastes and colours, to keep us all healthy. Enza Zaden thanks you for your outstanding work.

Enza Zaden is proud to support growers and the Rural Support Trust.
The Rural Support Trust helps rural people when times are tough.
If you need help before issues overwhelm please contact 0800 787 254.

Rural Support