

AMBITIOUS ASPARAGUS

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GROWING

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IN GREENHOUSES

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before



after



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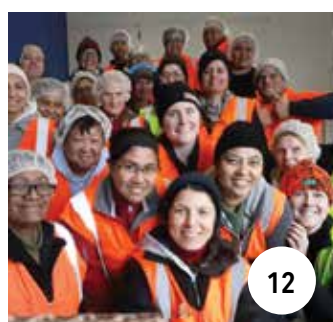
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CELEBRATING INDUSTRY SUCCESS EVEN WITH COVID



Words by Barry O'Neil, President : Horticulture New Zealand

As part of our yearly activities, normally after our Annual General Meeting we end the day with a celebration dinner recognising people in the industry who have worked hard in their respective fields on behalf of the wider horticulture industry.

Unfortunately this year with Covid restrictions and frustrations we will not be awarding trophies to people who have been recognised as the worthy recipients.

Rather than completely miss out this year, I want to use this article to recognise those in the industry who do a tremendous job, but may not always get acknowledged individually for their contributions.

We normally recognise outstanding contributions with the Bledisloe Cup, the President's Trophy, the Environmental Award, Industry Awards, and Long Service awards.

The horticulture Bledisloe Cup is the premium industry award in the New Zealand horticulture industry. There are only three Bledisloe Cups that exist, one we all know about from the All Blacks and Wallabies rugby games, a new one that has just been made for the exciting new horticulture Ahuwhenua awards, and our cup which is on loan from the New Zealand Fruitgrowers Charitable Trust. We award it to a person or persons who have made an outstanding and meritorious contribution to the New Zealand horticulture industry.

A huge thank you and my admiration for those in the sector who stand up for and work on behalf of their fellow growers for the industry's greater good, you are my recipients of the Bledisloe Cup. I would especially like to acknowledge the Chairs and the executive members of district associations and smaller fruit and vegetable product groups, who work without reward to provide for a regional grower and product group voice. We have a mixture of very successful and active district associations, such as the Pukekohe Vegetable Growers Association and Hawke's Bay Fruitgrowers Association, and then others that have been struggling somewhat recently such as the Te Puke Fruitgrowers Association. These groups and our smaller product groups don't always have the resources to pay the people involved, including administration support, so it's done by a small number of people who have agreed to stand up for their fellow growers. Whether big or small, successful or struggling, the people involved and their passion for growing in New Zealand doesn't change, so my thanks and acknowledgement to all involved, and you all get my award for the Bledisloe Cup.

The next award is Horticulture New Zealand's President's Trophy which is awarded to persons showing promise in horticulture industry business and/or leadership.

I am delighted that we have a very active Women in Horticulture group and take my hat off to the women who have worked hard both on their executive and governance group, and also in the wider industry to highlight

the real need for and importance of diversity in our organisations and businesses. And I'm also pleased that Horticulture New Zealand has been able to support the initiative to enable it to grow and succeed. All the people involved in this initiative get my President's Trophy for the work you do, which often goes unrecognised and was previously not always understood, but it's a really important initiative for our industry and for our successful future.

“

A huge thank you and my admiration for those in the sector who stand up for and work on behalf of their fellow growers for the industry's greater good, you are my recipients of the Bledisloe Cup



The Environmental Award is next, which recognises people or organisations that have developed and implemented a sustainable environmental project, with identifiable benefits. There are two categories of winners this year. The first relates to specific Resource Management Act issues that arise in our regions due to proposed changes to council policy resulting in resource management hearings. I very much recognise the efforts and commitment from all those growers who are

prepared to front up and present on behalf of growers in those regions, very much supporting the efforts of Horticulture New Zealand. To all of you involved I would like to recognise you with the Environmental Award.

The second category are those growers and researchers who are showing us all how we can do better in growing more sustainably. Whether that be using less fertiliser, better soil tillage and management methods, moving away from chemical calendar spraying, or other moves towards greater sustainability. Without you doing this work we will struggle to be able to retain our social license or consumer desire for our products, so with the Environmental Award I recognise all these growers and researchers.

The Industry Service Award is given to persons who have provided long-standing and significant service to the New Zealand horticulture industry. The award is focused on people in industry related support or supplier roles who have worked beyond the call of duty for the betterment of the horticulture industry.

To me it is a no-brainer that this must be awarded to our Recognised Seasonal Employer (RSE) scheme and backpacker workers who every year do such an amazing job for horticulture, doing hard physical work and not always in the best weather, but not complaining and just getting on and doing a really great job! We very much appreciate the work you do and we realise that without you we have a huge problem, which with Covid-19 challenges has become a current priority issue. The Industry Service Award this year goes to all the RSE and backpacker workers who work tirelessly for our industry.

The Life Membership of Horticulture New Zealand is awarded to persons who have provided distinguished and honourable services to Horticulture New Zealand. I would like to recognise the people who time and time again willingly respond to emails or telephone calls to give their time,

counsel, and talents to support the work of HortNZ. Whether that is in a governance or leadership capacity, being part of the various committees that enable us to function, or being part of specific collaboration groups to enable the best outcomes for the wider horticulture sector and growers. My thanks to those who support us with your efforts and talents, you are all worthy of Life Membership of HortNZ.

“ The Industry Service Award this year goes to all the RSE and backpacker workers who work tirelessly for our industry

My final award is a new one – the Grower Shout Out Award for all those people who have showed amazing kindness towards their fellow growers, the community and individuals within the community. It is really awesome to see the numerous support efforts happening all over the country from growers for such worthy initiatives such as foodbanks, work programmes to support Pacific Island RSE communities, community groups such as hospices, St John, Lifesavers, and many others. You all know who you are and I would like on behalf of the HortNZ to pass on our thanks and admiration for the wonderful work you have done and are doing.

I look forward to next year being able to presenting in person our horticulture awards to the many worthy recipients in our growing community!

Kia kaha. ●

NZGROWER

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REPORTING ON PERFORMANCE



Words by Mike Chapman, Chief Executive : Horticulture New Zealand

How do you know if an organisation is performing and meeting its targets and goals?

Each year, as organisations produce their annual reports and prepare for their annual general meetings, their boards and management grapple with how to show members and stakeholders that their organisations are performing. Horticulture New Zealand is no different.

We have a strategic plan that is put into action by our management plan. We measure how we are achieving the priorities of the strategic plan by a series of warrant of fitness key performance indicators. We also survey our grower members for their views, and finally we back this up with comments and explanations in the annual report.

It then all comes together at the AGM, which in HortNZ's case has just been held. This year's AGM had to be held by Zoom due to Covid-19, so the more detailed explanations that occur at an annual meeting were truncated. In this column I am going to go into detail about HortNZ's performance.

I think HortNZ's first key role is to positively influence government and councils, as they make decisions that affect anything to do with growing fruit, berries and vegetables. Our second key role is to get information about government and council proposals out to growers, and involve growers in the decision making so that their views are represented.

Covid-19 has changed our lives and made this a difficult year. One of the goals we set ourselves was to make sure accurate and timely information got to growers and the growing community. In our recent survey, 90% of those who completed the survey *agreed or strongly agreed* that this had been done well. There were three other questions in the survey that are important measures of HortNZ's performance: Whether HortNZ is creating an environment where growers can thrive; maintaining strong relationships with government; and adding value to growers' businesses. These survey questions were all answered with a greater than an 80% *agree or strongly agree response*.

The way we achieve those outcomes is through our work with government and councils. To measure how effective that is, our warrant of fitness key performance indicators ask how many active partnerships HortNZ has with government, and how many times HortNZ has been invited into developing policy discussions.

This is a direct measure of how much impact HortNZ actually has as decisions are being made. Election years are always a bit different and when you add Covid-19 into the mix, working in with the decision makers is perhaps more difficult than in other years. Despite this, HortNZ is involved – along with other horticulture groups as we work collectively – in just under a dozen formal and informal partnerships, ranging from environmental issues to labour and the employment of New Zealanders.

Over the past year, HortNZ has received invitations to join the early stages of policy formation on at least 18 occasions. This indicates that horticulture is seen by the decision makers as an important sector to have involved in policy development and decision making.

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I think HortNZ's first key role is to positively influence government and councils, as they make decisions that affect anything to do with growing fruit, berries and vegetables

There are areas where need for improvement has been identified, and that includes attracting people into horticulture, developing career pathways and promoting diversity. This has enabled the Board to address what we are not doing in these areas. Further resource and attention will be allocated here to increase HortNZ's impact and support for horticulture.

From the point of view of management, the survey and the key performance indicator results show that we have got a lot of what we do right. Areas for improvement have been identified and will be worked on. So that at the next AGM, which will hopefully be an in-person AGM, a fuller report can be given and what we have done to lift and improve performance can be assessed. ●

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YOUR LEVY AT WORK

INDUSTRY WIDE ISSUES FOR INDUSTRY GOOD

NATURAL RESOURCES AND ENVIRONMENT



AIR

Regulatory Review - Waste Oil

Some glasshouse growers use waste oil for heating glasshouses. The use has environmental advantages because it is a recycled product, but it also has potential negative impacts on air quality. Horticulture New Zealand is commissioning a review of the regulations that manage the use of waste oil, so growers can better understand the regulatory and environmental risks when considering options for heating glasshouses.

Northland Regional Plan - Agrichemical Mediations

Horticulture New Zealand continues to participate in mediations in Northland regarding rules to manage potential effects from agrichemical use. HortNZ has been engaging with vegetable and fruit growers and product groups. These groups are assisting HortNZ to provide the Council and other submitters with a better understanding of the risk management processes followed by growers.

HortNZ is hopeful that the mediation will result in provisions that manage risks and are practical for growers. However, if a suitable outcome cannot be reached through mediation, HortNZ is likely to pursue the matter in the Environment Court.

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WATER

NES Freshwater - Winter Grazing

The New National Environment Standard for Freshwater includes rules for winter grazing. The rules mean that some vegetable growing operations that graze animals within their rotations in winter, will require consents or certified farm plans to manage the potential effects from these activities.

- Applies to annual forage crops. This does not include grazing of pasture.
- Applies to all stock.
- Replanting is required as soon as possible, but no later than 1 October, or 1 November in Otago and Southland.
- There is an area threshold for consenting. It is 50ha or 10% of the farm, whichever is greater.
- The regulations apply from on 1 May 2021, if someone needs a consent (assuming that they are currently operating as a permitted activity so can access existing use rights for six months) then consent must be lodged by 31 October 2021.
- An alternative to a consent is managing this activity with a certified farm plan. The details of the certified farm planning process are not yet determined. The NZGAP Environmental Management System (EMS) add-on provides an independently audited process for assessing Farm Environment Plans. NZGAP (Good Agricultural Practice) intends to develop the NZGAP EMS so it meets the regulatory requirements. Currently NZGAP is developing the winter grazing module with the intention that it will meet the regulatory requirements.



CLIMATE CHANGE

He Waka Eke Noa – Measuring and Managing Emissions Guidance

HortNZ is participating in the government primary sector climate change partnership He Waka Eke Noa. HortNZ has been engaging with product groups on developing horticulture policy positions on farm planning, reporting, sequestration and emissions pricing.

“

He Waka Eke Noa is focused on reducing emissions using a Farm Environment Planning approach

He Waka Eke Noa is focused on reducing emissions using a Farm Environment Planning approach. For growers the main agricultural emission is nitrous oxide from fertiliser. Fertiliser can also result in nitrate leaching to water. There are efficiencies in managing the potential effect from fertiliser on water and climate together through a comprehensive Farm Environment Plan.

The first milestone of He Waka Eke Noa is that guidance will be provided to farmers on how to measure and manage greenhouse gas emissions through farm planning by 1 January 2021. An early draft of this guidance is currently under development. HortNZ will seek feedback from growers, district associations and product groups over the coming months.



LAND

Waikato District Plan Hearing

HortNZ is preparing evidence for the Waikato District Plan Hearings. The evidence outlines the key factors required from the Proposed Waikato District Plan in order for horticulture to be successful and thrive. These include:

- A framework that adequately protects and prioritises the use of versatile productive land for primary production, and that sustainably manages and provides for the range of factors and resources which contribute to the productive versatility of land.
- A framework that recognises that primary production buildings and structures contribute to the character and amenity of the rural environment.
- A framework that appropriately prioritises primary production and ancillary activities over and above urban development and sensitive activities, and is effective in managing reverse sensitivity such that impacts on primary production are avoided or mitigated.
- Provisions that adequately provide for the ongoing operation and development of horticulture, including:
 - controls and status appropriate for rural industry
 - provision for purpose-built seasonal worker accommodation
 - exclusion of artificial crop protection structures from building setbacks and daylight angles
 - amendments to building coverage controls to appropriately provide for necessary buildings and structures
 - provisions to enable rapid response to biosecurity incursions. ●



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HORTICULTURE NEW ZEALAND BOARD COMINGS AND GOINGS

Words by Andrew Bristol, Horticulture New Zealand

Two new directors are joining the Horticulture New Zealand (HortNZ) Board.

They are elected director Kate Trufitt and appointed director Murray Denyer. At the same time, Hugh Ritchie and Tony Howey have been voted back onto the Board.

Murray replaced Bruce Wills, while Leon Stallard retired from the Board at the Annual General Meeting on 25 September.

HortNZ President, Barry O'Neil, said he thanks both Leon and Bruce and very much appreciates the contribution that they have each made to HortNZ.

"Leon, an experienced apple grower from Hawke's Bay, has been a strong campaigner and supporter of our young growers, making the Young Grower of the Year competition happen in Hawke's Bay and Gisborne.

"Leon is also a major driving force behind the Hawke's Bay Fruit Growers Association and sits on the NZ Fruitgrowers Charitable Trust, a role in which he will continue with the Trust being important in its support of several HortNZ activities.

"Bruce has brought experience and relationships from the wider primary sector, along with government relations. Bruce has great networks and brought significant experience from his many other governance roles.

"I welcome Hugh and Tony being re-elected back onto the Board. I look forward to having Kate and Murray around the board table too, and the contributions I know they will all make."

Barry is particularly proud of Kate's return to the HortNZ Board. Kate was HortNZ's first Associate/Future Director in 2019. The annual programme is a development opportunity for a future leader to join the HortNZ Board.

"I'd like to think we had something to do with Kate's interest in governance and her decision to return to the Board as an elected director," said Barry. "She was our inaugural future director and it was great over that year to see her confidence grow. Her election to the Board by growers is a real tribute to her work and passion for the industry."

Kate said that having held the inaugural Associate/Future Director role gave her a very good grounding on the Board's activities and an overview of the wider horticultural sector.

"I believe that being in this role definitely played a part in my success in becoming a grower representative on the HortNZ Board.

"I'm thrilled to have got so much support from so many different places from across the industry.

"I am in the process of switching head space and working out what my new position means for me within the industry I have been elected to serve.



“

The amount of regulation and the number of issues facing growers is mind boggling

-Kate Trufitt

"As I'm already chair of the Horticulture Health and Safety Council, I am keen to show further leadership in that space, and look at ways in which the HortNZ Board can provide more clout to an area that is critical but complex.

"The amount of regulation and the number of issues facing growers is mind boggling. It really can be overwhelming for a grower who just wants to grow. I see a role for HortNZ in distilling and simplifying into big themes the various requirements, so that growers can understand and implement what's being asked of them by their customers and regulators, as cost effectively as possible."

Murray said he is very excited to be joining the HortNZ team.

"I am heavily invested in the horticulture industry, literally and figuratively, and the industry is my biggest professional passion. My legal practice is focused on the whole fruit and salad bowl, and I am a founding investor in Rockit apples.



“

Horticulture has no shortage of challenges. Two that stand out are labour supply and water

-Murray Denyer

"Horticulture has no shortage of challenges. Two that stand out are labour supply and water. In terms of labour, the situation was bad enough before Covid-19 and now it is a huge challenge, with the crunch point being the next summerfruit, kiwifruit and apple harvests.

"With water, we need to develop a long-term solution to the challenges of water access and supply, with regional regulation increasing and industry growth naturally creating greater demand."

Leon was appointed to the Board in 2014.

"During my time, I have appreciated the opportunity to meet growers from outside the pipfruit industry, and see how sophisticated and successful their operations are.

"This has also shown me that we all face the same challenges, such as cost of capital, compliance complexity, and the availability of labour.

"In addition, it's been great to be involved in encouraging and developing young growers, through initiatives such as the Young Grower of the Year and Ahuwhenua Trophy, which showcase our industry."

Leon said he feels horticulture has really come of age and now commands the respect it deserves.



"It's been great to be involved in encouraging and developing young growers"

-Leon Stallard

"For example, Ministers now come and talk to us, which shows they recognise the importance of our industry and how great it is."

Bruce Wills has been on the HortNZ Board since July 2016.

"It's been a great time to be involved in horticulture and really exciting to see its rise," he said.

"We've seen booms in kiwifruit, apples, avocados and cherries, and the industry has really taken its place in the sun.

"At the same time, it has been great to see the rise in profile and importance of Horticulture New Zealand. This is thanks to strong leadership, good management and the way that HortNZ has responded to industry challenges.

"HortNZ now sits at the primary sector leadership table with the likes of DairyNZ and Beef + Lamb, and meets regularly with the Prime Minister, other Ministers and senior government officials.



"It's been a great time to be involved in horticulture"

-Bruce Wills

"I am confident that horticulture's fortunes will just keep rising and that in a few years' time, the industry will be worth considerably more than \$6 billion."

Bruce says his time on the HortNZ Board has had a positive influence on him.

"Four and a half years ago, I was a sheep and cattle farmer, full stop. Now I'm growing grapes and olives, and have further stepped up my tree planting, having planted more than 2,000 native trees this year alone. I am also developing an exciting wetland project in a very dry area of the Hawke's Bay."

Bruce says it's good to see Murray Denyer taking up his position on the HortNZ Board.

"I sit on a bunch of boards and believe it's important to have fresh thinking and new people on them."

There are two appointed director positions on the HortNZ Board. These directors are appointed by the Board based on the recommendations of a Director Selection Group. Directors have full voting rights at all Board meetings and can be appointed for up to three years. ●



Horticulture New Zealand Board Future Director

Horticulture New Zealand is seeking a Future Director to serve and gain experience on its board. The year-long appointment commencing in January 2021 would allow the successful appointee to gain experience in governance, leadership and strategy. This position will suit an applicant who has active involvement in a horticultural enterprise giving an understanding of the issues and challenges that horticulture and growers face. This is a great development opportunity for a future leader with a genuine interest in governance. The Future Director will have the opportunity to be mentored by an industry leader and receive governance training. In making the selection, HortNZ's diversity policy will be taken into account.

The job description can be found at hortnz.co.nz/about-us/work-for-us. If you are interested in this role, please send your CV and a cover letter to Kerry Norman at kerry.norman@hortnz.co.nz. Applications will close at **5pm, Tuesday 3 November 2020**, with the successful candidate undergoing induction in January 2021 and attending their first board meeting on 17 February 2021.



NZGAP SOCIAL PRACTICE ADD-ON MODULE



Words by Jacqueline Neave - NZGAP technical and operations coordinator

NZGAP has been working with industry, auditors, retailers and regulators to finalise the NZGAP Social Practice add-on module in preparation for the commencement of audits and certifications in November.

Corporate social responsibility is an increasingly important issue in the global food supply chain, with all players being asked to demonstrate that food is produced in line with internationally agreed labour requirements and relevant national legislation. As a result, supermarkets in New Zealand and globally are increasingly seeking Social Practice certification in addition to the core GAP (Good Agricultural Practice) Food Safety certification. NZGAP has developed the Social Practice add-on module to empower growers to meet these requirements. Certification enables employers to demonstrate that they have good social practices in place for their workers, and enables them to supply product to multiple wholesalers and supermarkets.



The Social Practice add-on has also been benchmarked against relevant regulatory requirements and globally recognised social practice standards including GRASP (GLOBALG.A.P. Risk Assessment on Social Practice).

During the initial development it was recognised there were potential privacy issues relating to auditor review of employee records. Privacy issues have now been resolved by requiring employers to develop a privacy policy and make it available to workers. It is also recommended that a privacy clause is inserted into all new Employment Agreements going forward. NZGAP has developed templates and guidance to support growers' understanding and development of their privacy policies.

Numerous pilot audits have been undertaken to complete final tests of the certification and audit processes, as well as to refine the checklist, guidance and rules. The audits provided an excellent insight into the overall operation on farm and also provided an additional opportunity to hear from growers. We are now working through the feedback to make any final improvements before the full launch in November. The NZGAP Contractor Standard will also be launched in November, providing a holistic Social Practice solution for growers, contractors, employers and workers throughout the horticulture supply chain.

“

Certification enables employers to demonstrate that they have good social practices in place for their workers

Next steps

Businesses can now register for the NZGAP Social Practice add-on module, and can be audited alongside their next GAP audit, or as a stand-alone to meet a market deadline. Those certified to GLOBALG.A.P. GRASP or SMETA (Sedex Members Ethical Trade Audit) already meet many market and regulatory requirements, but may decide to register for the NZGAP Social Practice add-on (currently at no additional cost) to demonstrate local market or regulatory compliance.

NZGAP will be in contact with all registered businesses once the documents have been finalised, then an audit can be scheduled. ●

For further information about the NZGAP Social Practice add-on, visit the NZGAP website (www.nzgap.co.nz) or email jacqueline.neave@hortnz.co.nz

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HIGHLIGHTING WOMEN'S ROLE IN HORTICULTURE



Words by Elaine Fisher

Women play vital roles in all spheres of horticulture from growing to industry leadership, but their contributions are not always visible and that needs addressing, believes Helen Barnes, general manager, TomatoesNZ.

"I don't believe it is intentional, but women and the work they do has tended to be in the background and I would love to see that change," says Helen, who is also a member of Women in Horticulture, which aims to highlight the female contribution to the industry.

"We don't have any women on the 12-strong TomatoesNZ board and they are also not well represented on other boards. I think as an industry we need to ask what are the barriers to women taking up leadership roles, but also to recognise what they already do for the industry."

Helen is taking part in this year's Agri-Women's Development Trust Escalator leadership and governance programme for women in primary industries. "In the past most participants have been from pastoral industries, but it is open to women from horticulture too and I'd thoroughly recommend it."

Helen grew up on a dairy farm but when she was six her parents Carol and Derek moved the family to a lifestyle block on the Kapiti Coast where they opened a garden centre. "I loved helping in our huge home vegetable garden and in the garden centre, and realised early on that I knew the names of lots of plants and loved working with them."

Paraparaumu High School's passionate horticulture teacher Mrs Arthur, encouraged Helen to take horticultural papers for school certificate and bursary, which led her to completing a Bachelor of Applied Sciences in Horticulture at Massey. Invited back to complete an honours degree, Helen investigated the impacts of an ethylene inhibitor on apples and also sunburn on the fruit. Her first full-time job was as a horticultural consultant in the Bay of Plenty.

Moving to Wellington, Helen took up a role with the NZ Asparagus Council, part of VegFed, which shared an office with the Fruitgrowers' Federation. The two later merged to form the nucleus of today's Horticulture New Zealand.

"It was a time of significant labour shortages and the work I did was part of the run-up to today's Recognised Seasonal Employer (RSE) Scheme."

In 2011 Helen was appointed general manager of TomatoesNZ, the industry body representing around 130 growers with a collective farm gate value of \$129 million per annum, including \$12.2 million of exports to year end March 2020. The principal export markets are Australia and Japan. Product is also exported to many Pacific Rim and Pacific Island countries.

"Most of our members grow tomatoes in greenhouses and TomatoesNZ advocates on their behalf at government level. We also carry out research, particularly into pest and disease control, while reducing the use of sprays, and are active alongside other primary industry bodies and the Ministry for Primary Industries, on biosecurity." The industry is also investigating automation of many of the more challenging and heavy lifting tasks within greenhouses.



Helen Barnes - Women in Horticulture

One of the biggest challenges is the cost of energy. "All glasshouses are heated and energy costs are second only to labour. We need access to affordable, renewable energy. Solar is not an option for many as you can't put solar panels on a glasshouse, and the adjoining land is usually too valuable to cover with panels. Geothermal energy, heat pumps and biomass fuels are among the options under consideration."

Helen believes growing undercover is the way of the future for secure, environmentally friendly food production, especially in the face of climate change.

The mother of four young children, Helen enjoys being involved in their school and sporting activities, as well as walking the family dog, reading, Pilates and family holidays. ●

To keep up to date on Women in Horticulture news and activities, join our membership database by emailing info@women-in-hort.nz. We welcome everyone in New Zealand horticulture who is interested in this exciting initiative.



GEORGIE IS FLYING INTO A NEW CAREER

Words by Elaine Fisher

Georgie Johnston's ambitions of a long career in aviation may have been grounded by Covid-19, but in five short months her employment in the horticultural industry has really taken off.

Georgie joined the kiwifruit packing team at Punchbowl in March when the worldwide impacts of Covid-19 hit the aviation industry hard. As her skills were recognised by management, 29-year-old Georgie was given increased responsibility within the packhouse, and within three months was appointed as assistant packhouse manager.

"I was super stoked to be appointed to this role, which I decided to apply for because I appreciated the way Punchbowl had already recognised my skills and experience and were open to moving me up through the roles, even though I am new to the industry."

Colin Davies, managing director of Punchbowl in Pukekohe, says the company is delighted to have Georgie join its permanent staff.

"I have to admit that in the past if I had someone from the aviation industry apply for a role here I probably would have been sceptical about whether or not they would be right for the job," he says.

However, watching Georgie work in the packhouse illustrated how transferrable many of her skills were to horticulture. "I'm sure that spending time as cabin crew has helped Georgie develop great people skills, and she has a bubbly personality so gets on well with everyone."

Colin is impressed by Georgie's willingness to learn about horticulture and the post-harvest industry, and was pleasantly surprised to discover she also has engineering knowledge.

Georgie was among several people from the aviation industry who worked for Punchbowl during lockdown, but most have now moved on. While it was tough for those displaced from their normal jobs, Colin says Punchbowl was grateful to have their help during the kiwifruit harvest.

"Being based in South Auckland, we don't have ready access to a pool of horticultural staff as the Bay of Plenty does, and so rely on locals and overseas workers. With three shifts of 60 staff on each to fill, we were worried about how we would get the fruit packed, but were overwhelmed with the people from other industries willing to work for us."



Georgie Johnston, Punchbowl's assistant packhouse manager (far right in the orange blaze beanie), with her team

Those who joined the Punchbowl team came from a wide range of professional backgrounds, and Colin says he was impressed by their drive and their approach to their work. "In fact, we received constructive feedback from many on ways we could improve some of our systems, for which we were grateful."

When it comes to Georgie, says Colin, it is important to ensure she continues to find working at Punchbowl stimulating and can see clear pathways ahead to progress through the industry.

Horticulture was not a career Georgie had ever considered. "My whole family is involved in aviation. I was born in New Zealand but grew up overseas as my dad was an airline pilot. I returned to New Zealand to finish my schooling at Waiuku College and then went to aviation school."

Georgie, who is married to an airline pilot, was a contract flight instructor for the Auckland Aero Club before Covid-19 hit. "My income and hours fluctuated and there was uncertainty around whether or not my husband would keep his job. I decided to look for employment which would give me more guaranteed hours of work."

Georgie found out about Punchbowl's need for packing staff via a Facebook page set up by airline pilots to help each other find work. "I applied for the job and was really happy to get it. Although I had never considered a career in horticulture, I do enjoy gardening and my husband and I keep bees at home."

Long hours packing fruit was initially a challenge. "It's super-fast and you have to keep your wits about you. At first I thought it was harder than flying a plane."

Grateful as she is for the opportunity to work at Punchbowl, Georgie says there is a sense of loss too at the fact she has had to put her aviation aspirations on hold. Along with so many others, she felt stressed and anxious about an uncertain future and the fact that so much in life is now no longer under her control.

"It felt a bit strange coming into an industry I knew nothing about, but as it happened there were also a number of other aviation people on the team so that helped."

Working on the packing team alongside Georgie and Punchbowl's long-time staff were a geologist, an accountant, an architect, an auditor, and others from the aviation industry too. "What was awesome was that we all got on with the job to get the fruit packed."

Georgie says so often people identify themselves by their occupation and tend to move in the same social circles. Being displaced from their normal careers has opened the opportunity to take on new challenges, meet new people and learn new skills.

The skills Punchbowl recognised in Georgie included her talent for relating to and managing people, her strong focus on health and safety, and the added bonus of her engineering know-how. Georgie, who began her aviation career training in avionics, is able to diagnose problems with the grading machine, and in many cases, fix them herself. "I don't mind getting my hands dirty," she says.

What she also likes is the diversity of her role and the products handled by Punchbowl. "In August we were repacking kiwifruit and about to start packing blueberries."

“

I recommend anyone who has a can-do attitude and is keen to learn new skills, consider the horticultural industry, which is growing worldwide

Handling fruit under Covid-19 restrictions, both during the initial nationwide Level 4 lockdown in March and then in Level 3 for Auckland during August, meant that Punchbowl and indeed all packhouses, needed to implement protocols to keep staff safe.

"For me the way we operate now is 'normal', but I know that's not the case for all those who have been in the industry for a long time. It will be interesting for me to see how we pack fruit next year, with hopefully no or very few Covid-19 restrictions."

Georgie is enjoying working in the horticultural industry which she describes as "dynamic, fast-paced and exciting with new technology coming along".

"I recommend anyone who has a can-do attitude and is keen to learn new skills, consider the horticultural industry, which is growing worldwide. I feel a sense of responsibility being part of an industry which, along with agriculture, is helping keep New Zealand's economy up." ●

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COVID EXACERBATES INDUSTRY'S LABOUR CHALLENGES



Words by Alan Pollard, Chief Executive, New Zealand Apples and Pears

The horticulture sector was a star performer during the lockdown earlier this year.

Deemed essential services, the sector quickly reengineered itself to accommodate the strict hygiene and social distancing requirements to remain operating, thereby ensuring food security for New Zealand and overseas consumers and keeping people in work. During this time, the industry sought little in the way of government financial support.



Recently released figures show that fruit industry export values were up 10.1% and wine was up 14.8% in July 2020 compared to 2019. So even in the face of Covid-19 hitting our markets we continue to perform exceptionally well.

Our challenge as a sector now is how we can have certainty of labour supply for the coming season in an economy severely disrupted by Covid-19. The chief executives of Summerfruit NZ, NZ Apples & Pears, NZ Kiwifruit Growers, Vegetables NZ, NZ Wine and Horticulture New Zealand have been working collectively to address this huge challenge. Horticulture generally relies on three sources of seasonal labour - Recognised Seasonal Employer (RSE) scheme workers, backpackers, and New Zealanders.

As our borders closed, our RSE workers became stranded in New Zealand, away from their families and communities. The industry has worked hard to assist with the repatriation of those who want to return home. That will leave only a small proportion of the expected RSE workforce in the country. Visas for those who remain stranded here have been extended, but the industry needs RSE workers to return in time for our periods of peak demand. Coming from countries free from Covid-19, this should not be a concern to government nor a risk to the general community.

There are far fewer Working Holiday Scheme (WHS) visa holders in New Zealand than we would normally expect, with the government determined to send as many home as is possible. Rather than repatriate those people, we have asked that their visas be extended to allow them to work exclusively in the horticulture and wine sectors; this ensures that they won't displace Kiwis. ●

Footnote

In late September, the Government announced that people stranded in New Zealand on Working Holiday Scheme (WHS) visas could obtain Supplementary Seasonal Employment (SSE) visas. This will enable them to take up work in the horticulture and wine industries, where there are not enough New Zealanders available to do this work. The changes are for the 2020/21 season only.

The announcement was welcomed by the horticulture industry as a 'first step' towards finding solutions for the coming season's labour shortages.



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MEETING LABOUR CHALLENGES AROUND NEW ZEALAND

Words by Andrew Bristol, Horticulture New Zealand



Central Otago mayor, Tim Cadogan

Central Otago is forecasting a shortage of 5,500 in the region during December and January for cherry harvest.

Summerfruit New Zealand chairman and chief executive of Cromwell-based orchard 45 South, Tim Jones said the looming worker shortage was a huge concern and the industry was leaving no stone unturned.

'We are likely to have a severe shortage of seasonal labour, and we are likely to have issues with logistics in getting our crop, particularly the cherry crop to market because traditionally, it flew to export markets on passenger planes bringing tourists to New Zealand.'

Central Otago mayor Tim Cadogan said the looming labour shortage would affect 'every single person and business in the region'.

'Our apples and pears alone are worth \$35 million a year to the local economy. Every day, the cherry harvest puts about \$3 million into our economy. We could lose phenomenal amounts of money at a time when we can least afford it.'

In a severely disrupted labour market, the apple industry may be able to get through thinning under extremely challenging conditions, but unless there is a change in policy settings it will not make it through harvest.

New Zealand Apples and Pears Chief Executive, Alan Pollard said that the industry and the provincial economies that rely on it face potential catastrophic consequences if the labour supply remains constrained.



“We are likely to have a severe shortage of seasonal labour, and we are likely to have issues with logistics in getting our crop” -Tim Jones

'Our industry will be doing all that we can possibly do to attract kiwis onto work. That is our first priority and we recognise the obligation that we have to unemployed or displaced New Zealanders.'

'But the physical requirements of the harvest work, the location of the work in the provinces away from the main centres where clusters of unemployed reside, and the challenges of relocating unemployed kiwis away from their family and whānau support networks means our ability to access unemployed kiwis is constrained.'

'Returning RSE workers are essential to get our crop harvested.' ●



TAKING A COLLABORATIVE APPROACH TO LABOUR

Hawke's Bay apple and kiwifruit businesses are joining forces to support local workers looking for sustainable long-term employment.

With help from the Ministry of Social Development (MSD), a collaborative partnership has been established between T&G Global (Turners & Growers) and Ngai Tukairangi Trust (NTT) to provide on-going employment during different quiet periods experienced by both horticulture employers.

MSD's Regional Labour Market Advisor, Robyn Leake is passionate about driving local employment opportunities.

"The apple and kiwifruit sectors have seasonal labour peaks and quiet times that could complement each other. We saw an opportunity through working relationships with both sectors, to work on employment options whereby staff could easily transfer from one employer to the other," said Robyn.

Maurice Windle, T&G's Supply and Services Manager in the Hawke's Bay, said he and his team are always exploring ways to get locals into skilled and sustainable work.

"If we can join forces with our friends in the kiwifruit industry, to share those skills between sectors, keep people in jobs so they can work all year-round, and provide them with a clear career pathway for the future, then that's a great solution," he said.

From left to right: Richard Pentreath (NTT), Makita Butcher-Harries (T&G), Maurice Windle (T&G), Yvette May (T&G), James Talbot (T&G), Robyn Leake (MSD) and Warren Laugesen (T&G)

T&G Global employees recently visited one of the Ngai Tukairangi Trust kiwifruit orchards and were given an overview of what early season kiwifruit work involves.

Richard Pentreath, Hawke's Bay Regional Manager for Ngai Tukairangi Trust said that effectively managing staff numbers to meet peak demand at key times, whilst providing continuity of work for local people is a challenge faced by all fruit growers in Hawke's Bay.

“

The apple and kiwifruit sectors have seasonal labour peaks and quiet times that could complement each other

"By helping staff to move to further opportunities as existing jobs come to an end and narrowing the gap between seasons, apple and kiwifruit growers can both benefit by retaining skilled and work-ready individuals, who in turn, benefit from a smooth transition between employers and more secure income throughout the year." ●

GETTING KIWIS INTO WORK

Pre-Covid, the horticulture industry was already running programmes that are highly successful at getting kiwis from all walks of life into work in the industry.

Many of the larger growers and packhouse operations work with the Ministry of Social Development (MSD) to help solo parents, people who have been in prison and other long-term unemployed New Zealanders into fulltime employment in horticulture.

These growers and packhouses offer help with transport, accommodation and meals, and accommodate working parents' childcare needs through split shifts. They also offer pastoral care, such as addiction counselling and budgeting advice.

Lee Du Preez is the Head of People and Culture at Southern Cross Horticulture in the Bay of Plenty.

Southern Cross Horticulture works collaboratively with local iwi, the Ministry for Social Development and groups like ImpacTauranga and the Opotiki Workforce

Development Centre to help New Zealanders, who haven't previously had the opportunity, gain the skills and ability to get into the workforce.

Lee said the key is providing that initial support and going further than just the standard employment relationship.

'We offer things like transport options to and from work, relocation assistance, and in some cases, help with the first month or two's rent. If someone has a young child, we can offer them flexible working hours and job share options. Sometimes, these people also need extra pastoral care, like drug rehabilitation, mentorship and professional counselling services.

'Most of the kiwis we help and train go on to develop a passion for horticulture and a fulfilling career. The experience transforms these people who previously had little chance of gaining meaningful employment. It also has positive spinoffs for the next generation, by giving them hope for their employment and the means to enhance their communities.' ●



Lee Du Preez

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NEW APP AVAILABLE FOR EASIER BIOSECURITY REPORTING

A new app has been launched to protect the primary sector from unwanted biosecurity pests.

The Find-A-Pest app enables people to report potential biosecurity threats quickly with their smart phone by sending a photo and GPS location. The reports are sent to a community of knowledgeable people from primary industries, iNaturalist NZ (a web-based citizen science platform) and science organisations for identification.

Notifications of suspected exotic pests and diseases are then forwarded to the Biosecurity New Zealand exotic pest & disease hotline (0800 80 99 66).

The app was successfully tested in 2019 by scientists, community groups, forestry employees, kiwifruit orchard workers and regional council employees. Trial results proved Find-A-Pest was a robust method to triage observations of potential threats. Almost 500 observations were made during the case studies, and all identifications from Find-A-Pest and iNaturalist NZ were correct except one. The majority of the observations were identified within a day.

The app is now available from the Apple App Store or Google Play store for users to start reporting any suspicious insects, plants, plant diseases, or other pests that they see.

Users can easily submit photos and any additional commentary, straight from their phone. The app will automatically store the date, time, and GPS location of each observation, and you can choose to obscure your location from public view if you wish.

All observations are submitted from the app to the Find-A-Pest database. Low risk threats such as existing pests and weeds are then shared with the iNaturalist NZ community for further identification, while observations of industry sensitive species are kept securely inside Find-A-Pest. Regional councils and primary sector groups have access to the relevant parts of the Find-A-Pest database to inform their biosecurity operations, such as weed control. Potential threats new to New Zealand are shared with Biosecurity New Zealand for investigation.

Development of Find-A-Pest has been supported by New Zealand's Bio-Heritage National Science Challenge and Envirolink Tools, Biosecurity New Zealand (Ministry for Primary Industries), the Forest Owners Association, Kiwifruit Vine Health/Zespri, Horticulture New Zealand, TomatoesNZ, Summerfruit NZ, NZ Apples and Pears, NZ Wine Growers, Onions NZ, Vegetables NZ, with additional support from Te Tira Whakamātaki, and iNaturalist NZ. ●

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DON'T PLANT IT!

Words by Anna Rathé, Biosecurity Manager, Horticulture New Zealand

Spread the word: planting shop-bought food products in home gardens is a no no.

Know your source and the intended end use

As growers, you likely pay careful attention to the source of your planting material, whether it be seeds, seedlings, tubers, budwood, plants or trees. Sourcing clean and healthy planting material is one of the fundamentals of a successful crop. Planting material for horticultural crops may be produced here in New Zealand or originate from offshore sources.

Imported fresh produce, spices and herbs sold at supermarkets, dairies and fruit and vegetable shops are intended for eating. Do you know people who have planted the supermarket potatoes, garlic or ginger that started to sprout after too long in their pantry? Or decided to try their luck growing some plants from the seeds inside the dried chillies in their spice drawer? Planting these items presents a biosecurity risk that can threaten our industry.

Imported food products (be they fresh, dried or preserved) must comply with strict Import Health Standard regulations. These import conditions are set based on the intended end use of the goods being consumption. When consumed as intended, most if not all of the product is destroyed, reducing the biosecurity risk. If, however consumers choose to plant food items, they may survive and flourish, providing an opportunity for any exotic pests, pathogens and diseases that may be present to establish in New Zealand. For this reason, fresh fruits, vegetables and herbs, as well

as seeds from fresh or dried produce (including spices) intended for eating should not be planted.

Imported material that is intended for planting (e.g. budwood or seed for sowing) must also comply with very strict biosecurity measures set out in Import Health Standards. The import conditions for products intended to be grown are set based on the knowledge that they will be planted into an environment where they will thrive. Stringent measures are in place and enforced to ensure that exotic pests, pathogens or diseases are not inadvertently introduced via this pathway. The import conditions are very strict in line with the heightened biosecurity risk posed by the intended end use.

“

Planting shop-bought food products can pose a biosecurity risk that can threaten our industry

Spread the word

Spread the word to friends and family, whether they are experienced home gardeners or those just starting to experiment with growing. Knowing the end use of plant material is important: is it intended for planting, or eating? If it is intended for eating, ask them to think twice before planting it in the garden. Planting shop-bought food products can pose a biosecurity risk that can threaten our industry – plate it up instead! ●



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THE FUTURE'S IN ASPARAGUS

Words by Ailsa Robertson, Sustainability and Extension Manager, Horticulture New Zealand

Asparagus growers are securing their licence to grow by demonstrating that they understand their environmental risks, and are committed to a journey of continuous improvement and audited good management practice through Farm Environment Plans (read more about this on page 24).

But that's not all the sector is doing to safeguard its growing future. Through new research and technological solutions, they are gearing up to optimise asparagus growing and improve yields and profits. They are an ambitious bunch!

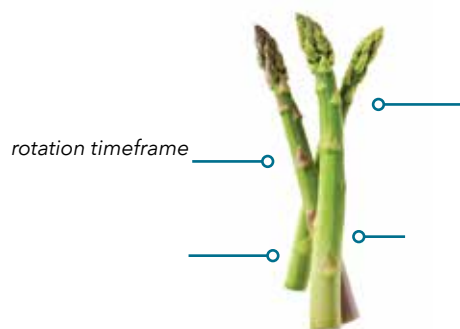
Access to labour is a key issue for asparagus harvesting globally. The highest cost for most growers comes from the high labour demands of asparagus being hand harvested over a short season (about 100 days). For this reason, the New Zealand Asparagus Council is supporting an automated asparagus harvester which is being developed by the University of Waikato and Robotics Plus Limited. Development of an automated harvester means people can be upskilled in technology and assigned other tasks rather than hand harvesting in the field. Shifting talent to more skilled areas will allow investment and growth in the industry which is currently constrained by labour issues, with potential for spin-off benefits across the value chain and also other crops.

“

There is a lot of ambitious work going on in the world of asparagus

A key challenge for this project is locating asparagus spears across the width of the harvester efficiently, but they have a solution. The team has been working on improvements to the visioning system and speed to enable accurate location of spears. Version 1.5 is being tested and refined with trials in Waikato this asparagus season, aiming to substantially increase the harvesting rate as compared to the initial version. On the next version, the team plans to review and improve the vision system and make a commercially viable prototype, subject to funding support.

Asparagus is grown in a range of soil types from Waikato to Canterbury. With such a variety of soil conditions, the fertiliser that each crop requires can vary considerably, as can the nutrient management practices.



Asparagus has a rotation timeframe of up to 20 years. It is long-lived, has deep roots, and generally likes free draining soils such as light open structured loams with large pores. Fertiliser requirements vary depending largely on the soil type, but also climate and plant growth phase. In some cases, no additional fertiliser is applied other than the nutrients recycled back into the soil from mulched ferns in the autumn.

Given the variability of nutrient needs and management practices across the asparagus growing community, they are looking at how to minimise their impact on the environment, while maximising crop yields. In conjunction with the sector's adoption of Farm Environment Plans, they are embarking on a review of the existing research and guidance on nutrient management to identify what further trials and information may be required. They hope to further improve the efficiency of fertiliser use to minimise nutrient losses below the root zone while obtaining the optimal nutrients for crop yield.

Needless to say, there is a lot of ambitious work going on in the world of asparagus. Some of this work, namely nutrient research, will have applications far wider than just this unique ferny crop. As improvements in growing techniques are developed with both the environment and production in mind, benefits will be shared with growers and consumers alike. It will be exciting to see how these changes end up in the field, whether it's a robot picking asparagus or something else entirely. ●



ASPARAGUS INDUSTRY UNITE TO IMPROVE THE ENVIRONMENT

Words by Hugh Chesterman, Horticulture New Zealand

It's always been good for you, and now, it's even better for the environment.

New Zealand asparagus growers are celebrating the new season; and the other reason for celebration is that most of their industry now have Farm Environment Plans in place.

As part of ongoing efforts to improve how asparagus is grown, the industry has achieved a horticultural first by taking a collective approach to farm planning. Over 90% of the asparagus harvested is now grown using Farm Environment Plans to measure, manage and reduce environmental impact.

"As rules around environmental impact tighten, Farm Environment Plans are increasingly more important to have," says NZ Asparagus Council business manager, Karen Orr.

"They are a tool in a grower's arsenal for improving the environment and meeting regulations, but they're not a one trick pony. Rather, they're more like a Swiss army knife, not just a plan but also a roadmap for future improvements, how to document progress and meet Good Management Practice standards."

Early adopters of Farm Environment Plans, Cam and Catherine Lewis, see advantages for the industry to be leaders in this field.

"There are big advantages in terms of marketing and also in meeting regulatory requirements," Catherine says. "We're able to say to our consumers that as growers, we are doing our best by the environment and that the asparagus they are buying is produced in a sustainable way. From a regulatory point of view, we can say that we are proactively managing our environmental footprint and are already on the right track."

Lewis Farms recently passed their audit to achieve certification for their Farm Environment Plan as part of the New Zealand Good Agricultural Practice (NZGAP) Environment Management System (EMS) add-on. The NZGAP EMS add-on is a way for growers to create a Farm Environment Plan that is tailored for their growing operation, as part of their existing GAP system (whether they use NZGAP or not). The add-on captures progress that growers are making towards good or best management practice.

The EMS add-on enables growers to create their own Farm Environment Plan that meets regional and national requirements using a toolbox of risk assessments, good management practices and best management practices that are applicable to horticulture. Growers are in the driving seat



when creating their plan, so many will be able to use the EMS add-on without needing to hire external consultants to create a bespoke Farm Environment Plan.

"You can have either a grower led Farm Environment Plan, or a consultant led Farm Environment Plan," says Andrew Barber, director of Agrilink and a Farm Environment Plan specialist. "The difference between the two is cost and how much ownership you have over the plan. Creating your own through the NZGAP EMS add-on is cheaper and creates a plan that you know inside and out."

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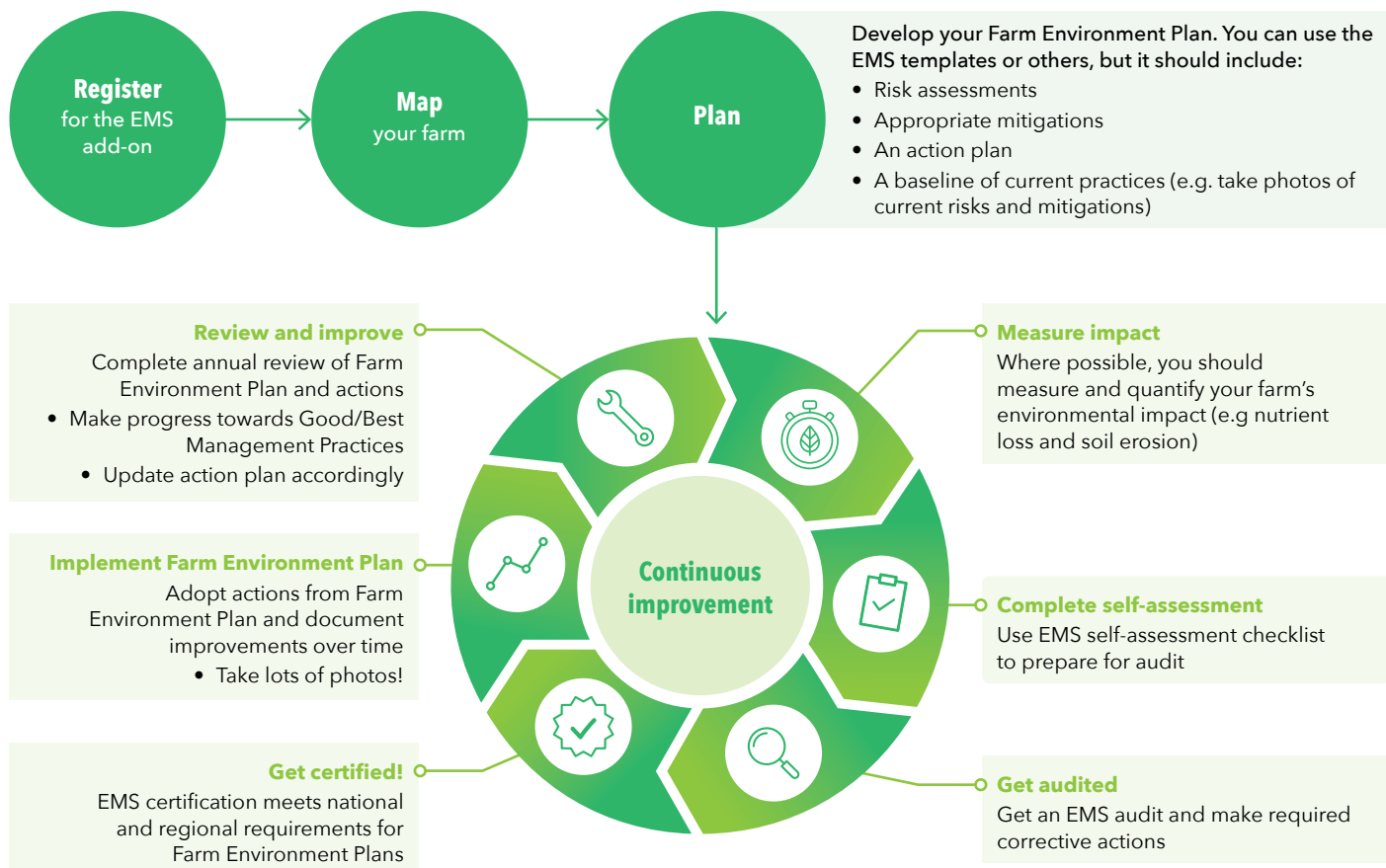
"Not everything needs to be perfect on day one," Andrew says.

"If you don't have the right infrastructure or good management practices in place right now, it's a benchmark for future improvements to be made. Farm Environment Plans are all about identifying the aspects of your growing which have an environmental impact, and then figuring out what you can do to improve things over time.

"It takes a bit of a change in thinking to realise that there are many things which have an impact. Things like the slope of your land, where you place a headland, or even where you drive a tractor can all have an impact on erosion and sediment loss. The trick is recognising those factors and figuring out a way to minimise that impact which works for you. This can be as simple as not driving over a certain part of a paddock. It's not about reinventing the wheel, and it doesn't need to be scary."

A testament to how achievable creating a Farm Environment Plan is when using the NZGAP EMS add-on, the asparagus grower collective were able to complete the first steps of their plan during a workshop held as part of the New Zealand Asparagus Council Annual General Meeting in August. ●

NZGAP Environment Management System (EMS) add-on process



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FARM ENVIRONMENT PLANS REVOLUTIONISE GROWING PRACTICES

Words by Hugh Chesterman, Horticulture New Zealand

Early adopters of Farm Environment Plans, Cam and Catherine Lewis, say they are now having conversations that could revolutionise their growing practices.

"Looking after the land has always been our focus, which is why we started this Farm Environment Plan journey," Catherine says. "We've always thought that we were doing okay, but we never knew for sure. Through our Farm Environment Plan, we've been able to set a benchmark and use this as the starting point for improvements we need to make."

"Putting together a Farm Environment Plan can be a bit intimidating but the process itself is very achievable. Not everything will be perfect, but we now have a clear direction on what we are going to do to reduce our environmental impact."

Lewis Farms has found several advantages already, one being the creation of farm maps. "The mapping exercise was really useful," Catherine says. "It had been one of those low-priority jobs that you never quite get to. We now have this amazing mapping resource for when we want to allocate a task to staff or a contractor."

Luckily, it's not just Cam and Catherine who are thinking of how to improve things. After going through the Farm Environment Plan process, Catherine says that others on the farm are eager to help. "Once we had completed our action plan, we took our farm manager and agronomist through the things that we'd identified to improve on. They wanted to get started right away!"



Cam and Catherine Lewis were presented with their audited Farm Environment Plan certificate by Karen Orr, manager of the NZ Asparagus Council

Lewis Farms has also found that they are now having more open conversations with other growers in the industry about improving growing methods. "I believe the workshop in Taupō with other asparagus growers will be the catalyst for some real and meaningful change in some of our growing practices," Cam says. "We're now having open conversations across the industry about things like nutrient and fertiliser use. We now know what areas need more research, and the NZ Asparagus Council will be able to help take this research forward."

"After the workshop, I started to question whether we can be applying fertiliser in a better way. We are now asking ourselves things like: should we be applying more foliar fertiliser? Are we applying it at the right time of year when the plants need it most? Do we need to be using a helicopter during fern growth, or would it be better using a side-dresser in late harvest? If we are able to get this right, it could be revolutionary."

Cam says it's been really useful for them as a multi-generational business. "Even if you've been at the cutting edge for a while, you'll inevitably end up doing some things because that's the way things have always been done. Through this process, we've been able to take a step back and start challenging yesterday's thinking and figuring out if more modern practices can make things better, both for the business and also the environment."

Keeping an eye on the horizon, Lewis Farms is confident that they are on the right track. "Before we started, I was really inspired when seeing some of the before and after photos from Woodhaven and other growers' Farm Environment Plans," Cam explains. "By starting now, in five years' time, we're going to be able to show the same." ●



Always out picking with a smile, Lewis Farms have been fortunate to have a full crew of RSE workers for the start of the season



SILVER LINING MAY BE STUDENT SWITCH

Words by Glenys Christian

Even during a pandemic people still need food to eat, says Charlotte Connoley, the managing director of South Pacific Seeds (SPS).

So she's hopeful of a silver lining of sorts with more youngsters encouraged into careers in horticulture as a result.

"We worked all the way through and were privileged to be able to do so," she said of the wider sector servicing horticulture. "So maybe we should be capitalising on that. Food production was a key area of government policy so food channels were kept open."

She says it made her feel all the more fortunate to have made the career choice she did 20 years ago, and she hopes recent events will push more students to do the same.

The Pukekohe-based company has been strongly involved with young people in the industry through its Young Growers Group, which meets regularly to look at different horticultural businesses or learn in more detail about some aspect of growing. "It's camaraderie, a learning opportunity and also a chance to see other businesses," she says.

But after being involved with the recent Careers Expo she believes there's a lot more potential to attract an even younger group to look seriously at horticulture.

The head of agriculture and horticulture at Pukekohe High School, Dave Matthews, invited a number of local horticultural companies to the Expo, which Charlotte says was a great opportunity for high school students to better understand the careers available to them in the industry. And there was plenty of information on which subjects would best suit for particular roles they were interested in. "It gave them a taste of the industry."

And with plenty of fresh produce being given away by the companies participating, that was literally happening with some students sampling vegetables such as broccoli for the first time.

SPS put its money where its mouth is at the Careers Expo, making it known that it had an after-school job available seed packing. "We had never employed a high school student before but we had a bit of interest," Charlotte says. The successful applicant isn't studying agriculture or horticulture, so this is a chance to broaden their perspective rather than working in retail such as a fish and chip shop or the local supermarket.

"We've always employed new graduates and we've reaped the benefits," she says.



Charlotte Connoley (right) and Sarah Butters, product development agronomist with South Pacific Seeds, who coordinates the Young Growers Group

"While they take more training, they add more to the company overall because they're constantly challenging things."

After the Expo she had a more detailed conversation with Dave Matthews about what could be done to get more students involved. Sometimes he brings agriculture and horticulture students to Young Grower Group meetings, following the lead of Austen Singh Purewal, who took out the Young Vegetable Grower of the Year title last year and regularly attended the meetings.

They came up with the idea of a workshop with more of a question and answer session to tease out exactly what the youngsters want to know about careers in horticulture.

Even with Pukekohe's dependence on horticulture many students were unaware of what it offered and also thought all the work was highly physical. "Horticulture is in and around their own environment but they just live alongside it or drive past the gate, not seeing inside."

"We want to get Year 11 students interested in science. Once they are 16 or 17 they're thinking about what they're going to study, but the foundations need to be there earlier."

When she spoke to two female students at the Expo they told her they wanted to be doctors or lawyers, enticed by the high-earning capacity of such careers and the potential for overseas travel. So she was quick to explain to them that there are a range of roles in horticulture where remuneration is higher than they might have thought, and great opportunities to work in the same field while completing their OEs.

"Horticulture is so seasonal and diverse," Charlotte says. "It's a shame that a lot of students miss out on that understanding. It's a complex beast and there's room for everyone." ●



RSEs WELL-CARED FOR

Words by Anne Hardie



Pastoral care officer Tarmra Heal with Tongan RSE workers in Tasman

Some of the Nelson Recognised Seasonal Employer (RSE) scheme workers who couldn't fly home because of Covid-19 have been learning building skills and getting involved in community planting projects while they wait to either go home or start the new season.

Vakameasina Nelson teamed up with Menzshed and Mitre 10 to teach about 20 RSE workers building skills when their seasonal work finished. The programme is designed to teach a range of skills to workers from the Pacific during their stints in New Zealand, and Nelson coordinator Lara Topping says it became "suddenly very busy" when workers couldn't get home.

For 10 weeks, the RSE workers from Vanuatu trained part-time with Menzshed members on building projects so they could use their time without work to gain new skills they could eventually take home.

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Our community has been amazing; they jump at the chance to help out

Lara says it has been a good distraction for workers who are missing home, with some unable to be there for the birth of babies or the passing of family members.

Others have taken up non-contact boxing for fitness after free instruction was offered to those who couldn't get home.

"Our community has been amazing; they jump at the chance to help out."

At Freshco in Nelson, 40 RSE workers from Tonga haven't been able to get back there and there has only been enough work to keep some of them employed. The rest have had occasional days working voluntarily in the community, including a few days labouring on a Habitat for Humanity project, and also spreading mulch in a newly-developed Nelson City Council garden.

General manager Peter O'Sullivan says it gets the RSE workers out and about rather than twiddling their thumbs when they are missing home with not much to do. Some were expecting to go on a repatriation flight home in August but it was cancelled when the new Covid-19 cases appeared in New Zealand and that was particularly hard on those people, he says.

"We're trying to protect them from false expectations of getting home," he says. "We're actively looking for work for them and have about half wanting to stay through to next season and the other half desperately wanting to get home. And we don't know if they would get back."

On Wairepo Orchard near Nelson, a repatriation flight in July was able to get two RSE workers home to Tonga, but the others are expecting to stay in New Zealand now through to May next year or August, which are the months they usually return home.

After seasonal work came to an end, the orchard was able to arrange grape-pruning work for some of those workers in Marlborough, and has also arranged a couple of weeks' work ahead on a blueberry garden. That will help get them through to the start of apple thinning when there will be full-time work on the orchard again.

Those with little or no income are receiving government funding administered by the Red Cross which pays for much of their living costs here in New Zealand. However, without full-time work they have little money to send home.

Most of the RSE workers, like Keinge Laulotu, had jobs lined up back in Tonga to cover living costs when they are not working in New Zealand. At this time of year he is usually working as a security guard back in Tonga where he has a wife and five children aged between three and nine years.

“

After seasonal work came to an end, the orchard was able to arrange grape-pruning work for some of those workers in Marlborough

Though their RSE work enables them to earn good money while they are working through the horticulture season in New Zealand, he says that money is often dedicated to a home or new car and doesn't cover living expenses for the entire year.

Like most of his fellow RSE workers, he would be back in Tonga planting his land now with crops such as taro, yams and tapioca.

Pastoral care officer Tarmra Heal says it has been particularly hard for the RSE workers not knowing when they will get home, especially as cases of Covid-19 in New Zealand keep the Tongan border closed.

“We try to keep them informed, but there's not much to tell them because no-one knows.”

At nearby Amberland Orchards, 10 RSE workers haven't been able to go back to Tonga, but owner Pippa Hansen says they have been able to employ them three days a week or more through winter with pruning or in the packhouse. As work ran out, there would be a six-week period where those workers would be relying on the Red Cross vouchers until apple thinning provided more work.

Despite the challenges, Pippa says the men have been managing well and have plenty of social interaction with other Tongan RSE workers in the region. ●

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SHORTAGES AVERTED AT LAST MINUTE

Words by Glenys Christian

Major supermarkets were close to facing shortages of some fresh vegetable lines in August due to the problems with Covid-19 Level 3 restrictions says Pukekohe grower, Brendan Balle.

"And the problem could be worse if New Zealand faces another Covid-19 type pandemic and the government and government departments don't acknowledge and learn from the mistakes made leading up to and during the recent Auckland lockdown," he added.

"People in Wellington just didn't understand how important it was to move across borders with the whole vegetable production system being a highly intensive and very complex business.

"It also caused a lot of stress and mental health issues for some essential workers who lived within the Auckland borders but faced lengthy delays at Bombay and Pukekohe checkpoints. It was absolutely crazy some days with queues up to five kilometres long and people waiting to get through for two or three hours for four or five days in a row."

Brendan said contingency plans should have been put in place between the first and second lockdowns.

"This could have been achieved by working proactively with Horticulture New Zealand, growers and other essential industries to look at various pandemic scenarios and what effect border positioning and controls would place on the food supply chain."

“

A fatal flaw was the lack of understanding of how many people living in the Waikato work in Auckland

He believes the solution would have been to place border restrictions closer to where the Covid-19 cases were found, in a similar way to containment procedures for fruit fly outbreaks.

"It's a well-tested system and should be the way forward."

The lockdown was frustrating and stressful, according to Pukekohe Vegetable Growers Association (PVGA) president, Kylie Faulkner.

"It seemed to the people on the ground, trying to produce and provide food for Auckland and New Zealand, that there was very poor planning leading up to this lockdown," she said.

Placement of the border crossings made logistics challenging and there were time constraints trying to get staff to work and then hold-ups in production during the day.

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Placement of the border crossings made logistics challenging and there were time constraints trying to get staff to work and then hold-ups in production during the day

A fatal flaw was the lack of understanding of how many people living in the Waikato work in Auckland.

Another issue was communication with staff manning the borders, as they were receiving different messaging as to who was allowed through.

"This meant our staff were constantly getting told different things about paperwork and ID," she said.

And there were issues with being able to guarantee support services could get to where they were needed, such as when a harvest tractor had a tyre blow-out. If the situation was to happen again, she believes the people on the ground should be listened to more.

Brent Wilcox from A S Wilcox said the bureaucratic process was quite long-winded, affecting businesses such as theirs, straddling the Auckland-Waikato border.

"While a good dialogue was developed with the Police there were some anxious moments with Ministry of Health processes which didn't recognise the amount of crossing the border which could be required in the space of a day to carry out normal farming operations." ●



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POTATOES IN THE AGE OF SHIFTING MARKETS

Words by Heather Woods



Annat Farms have been growing potatoes for over a century in Canterbury's Selwyn district

In 1918, still a teenager, Quentin Wright wrote in his journal that they were planting potatoes when news came through that the First World War had ended, so they stopped for a celebratory drink.

It was also a time when the great influenza pandemic rocked the world and 9,000 Kiwis lost their lives. Over a century later and under the watchful eyes of New Zealand's Southern Alps, four generations of the Wright family still live in Sheffield. Stuart and Simon Wright farm arable crops and specialise in lamb finishing on their 330ha, along with growing seed potatoes. And they too, are dealing with the fallout of the global pandemic.

Potato basics

Potatoes are very pure plants. Sterile, true-to-type plants are tissue cultured (a slice of the tuber is bred up into many tubers as generation zero). They go into the field and are multiplied into generations one and two. Annat Farms plant crops from generations two and three seed in September and it's all systems go until November. Their export crop is harvested at the end of February, with the main seed crop (20-25ha) completed by April, at which point they're graded for size, any defects removed, and then stored. This extensive process means that changing varieties can't happen quickly.

Sitting at around 330 metres above sea level, Sheffield and nearby Methven have typically been great growing grounds because there's less risk (than those down-country) of blight affecting their potatoes (thanks to the regular, howling northwest winds). In fact they've only seen blight a couple of times (something Stuart puts down to less humidity), and they have less aphids than many potato plants.

And despite reliable rainfall helping with good yields, the Central Plains Water (CPW) irrigation scheme has provided a way to insure themselves against climate change – and the difference it has made has been phenomenal. Last year was their best harvest ever, and it's allowed them to branch out into garlic (by leasing land to Marlborough Garlic) and processed peas for Wattie's. This has effectively created an efficient, double use of their land.

The dynamic market of fresh potatoes, chips and crisps

Each potato market – seed, fresh and processed (fries and crisps) – requires different potatoes, which are grown, managed and marketed differently. For example, a good eating potato (for the fresh market) will not be grown for a fry potato. So in the seed industry, they're matching their production with the merchants who own each of the varieties. But potatoes are a fluctuating market and it is necessary to have a tight relationship with produce agencies who export. Annat Farms focus on the seed and fresh markets, and they supply a lot of the big growers with what they produce.

South Pacific exports and pandemic problems

In Fiji, it's common for potato to be the base ingredient for standard family meals. Rocket is a potato variety that suits that market, and is mostly headed to the supermarkets of Fiji to meet that demand. It's planted early and harvested in late February or early March so it's out the door before their main harvest is under way. But their recent focus has been the Covid-19 pandemic.

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Imagine, that suddenly the entire New Zealand food service industry shuts down. You have a potato fry industry closely linked to that sector, that also suddenly stops. An entire year's worth of global production flowing to meet that demand grinds to a gut-wrenching halt. Where does the oversupply go?

Imagine, that suddenly the entire New Zealand food service industry shuts down. You have a potato fry industry closely linked to that sector, that also suddenly stops. An entire year's worth of global production flowing to meet that demand grinds to a gut-wrenching halt. Where does the oversupply go? What made things worse for northern hemisphere growers is that the product being sold was last year's harvest, and their next harvest was already in the ground with no way of reducing its size. It has meant that northern hemisphere growers with a surplus of produce have been looking to divert product wherever they can, including to New Zealand. It's put pressure on New Zealand because our biggest fry market is Australia, and they're now having the same issue. There's an oversupply of fresh product and product in storage, but at least here in the southern hemisphere the timing meant growers like Annat Farms have been able to make decisions before their next planting hits the ground.

Looking ahead with caution

Crops, potatoes, livestock, crops: it's a capital-intensive cycle for Annat Farms that simply won't stop; a juggling act that needs constant management. Despite being allowed to carry on business during lockdown, they feel that between now and Christmas the true position of horticulture as a whole will likely be shown. For that reason they're taking a precautionary approach to budgeting and contract commitments, and will need discipline, drive and enthusiasm to limit their exposure, Stuart says. Keeping a vigilant eye on the domestic and international markets (for what might be looming) will be important, but at the end of the day they're doing what they've always done, they just tweak things when needed. ●



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LATERAL WINS LOCALLY

Words by Glenys Christian

Usually a new product developed in New Zealand receives recognition in this country before being recognised offshore, but the reverse has been true for Ecolibrium Biologicals' bacteria-based alternative to chemical pesticides.

Lateral won the Callaghan Innovation Partnership and Collaboration Award at Fieldays Online recently, but as the Pukekohe-based company's technical specialist Lisa Lewis explains, it has already received a number of international awards.

It uses a bacterium, *Brevibacillus laterosporus* strain 1951, first identified a decade ago in Canterbury brassica crops as being particularly effective against caterpillars. Ecolibrium worked with the Bio-Protection Research Centre at Lincoln University to develop the product, which has now been tested in seven trials in six different countries, with results showing it is effective in controlling caterpillar pests without harming crops.

"It's been a long process with lots of results from indoor and outdoor trials," she says.

Lateral has been shown to perform as well as chemical products available to growers and can be made available at a similar price point.

The trial work was carried out overseas because more rapid results could be achieved than in this country. It was planned that field trials would take place here before the end of the year, but with the arrival of Covid-19 that's been put back to March or April 2021 depending on approval from the Environmental Protection Agency (EPA) and Agricultural Compounds and Veterinary Medicines (ACVM).

Once Lateral's commercial release takes place the company may well look to local growers to get involved in further trials.

"New Zealand is a leader in the space of making certain what we put into the food chain is as clean as it can be," Lisa says.

Sales of biologicals are likely to gain parity with chemicals by 2050 as concerns grow over residues left in the soil as well as the increasing risk of resistance if the same product is used repeatedly.

Ecolibrium Biologicals' managing director Ragu Wallabh, a grower himself, said there's been a huge amount of interest in Lateral particularly with a number of chemical



Ecolibrium Biologicals' technical specialist Lisa Lewis with the Partnership and Collaboration Award, sponsored by Callaghan Innovation, which it won recently.



Bok Choy - Most of Ecolibrium's indoor trials of Lateral have been carried out on diamondback moth caterpillars on bok choy plants.

products already removed from the shelves. And even if they can still be used here, produce can face restrictions in overseas countries where they are banned.

There were 20 strong entrants in the Fieldays Innovations Awards Prototype category, which Ecolibrium Biologicals entered for the first time. It had intended to exhibit at Fieldays in order to showcase Lateral, but even with the event going online was still able to attract a lot of attention.

"It's nice to be recognised locally," Ragu says.

After it's available in New Zealand it's planned to launch Lateral in the United States within two years and in Europe within five years. Ecolibrium is at present being courted by multinationals hoping to gain licensing rights. But Kiwi growers will definitely have first dibs on the product, as the company is retaining the New Zealand and Australian markets.

Overseas interest is also strong in the pipeline of other products which Ecolibrium is developing, including a herbicide which it is hoped will prove to be a non-chemical alternative to glyphosate. Not only is it non-selective, it is a systemic, working from the roots up instead of just burning off the tops. As the next cab off the rank after overseas trials, it should be commercially available within 18 months. A broad range non-chemical fungicide is also being developed to be released further down the track.

Ecolibrium Biologicals was founded by its technical director, Stephen Ford, who believes that low public acceptance and problems emerging from synthetic chemistry are making a purely agri-chemical approach to agriculture increasingly uneconomic and unpopular. So the company researches New Zealand's novel biota to find new technology candidates to optimise and commercialise through a research network involving Crown Research Institutes (CRIs), universities and private companies. ●

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CROP MONITORING CONTRIBUTES TO CUTTING COSTS

Words by Glenys Christian

Two Pukekohe trials have shown that using crop monitoring as part of an integrated pest management (IPM) programme can control onion thrips as well as conventional practices while reducing insecticide use and costs.

Thrips are the main insect pest in New Zealand onion crops, causing damage which can mean bulbs aren't suitable for export markets. And onion growers are under pressure to look to alternatives as the limited range of chemicals they can still use on their crops for thrips control is reducing all the time. A low residue insecticide programme could provide a competitive advantage overseas as consumers seek out cleaner, greener produce.

The trials on crops of Early Long Keeper (ELK) grown at Waiuku and Rhinestone at Puni were run by Fruitfed Supplies and FMC Agricultural Solutions. They compared conventional control measures with boosting naturally occurring insect predators by applying a large amount of degradable organic matter in the form of mulch between the crop rows. The oat silage went on between flag and two true leaf stage before there was any chance of a thrips incursion, so it could decompose, and a micro-ecosystem could develop. Numbers of beneficial insects such as gnats and whitefly grew as they fed on the fungi in the mulch, followed by predators feeding on them and eventually thrips as they established.

The thrips numbers and life stages were recorded weekly in both crops, comparing numbers in trial and conventional areas using crop monitoring; then when required at peak pest pressure periods selective chemistry targeted thrips while being soft on the beneficial insects. The conventionally managed sites started applying insecticides very early, while the weather was cooler, and the thrips populations weren't developing quickly. Both plots had population spikes, but timely application of Benevia, known for its IPM benefits saw these rapidly drop back. Uphold was used closer to harvest.

At the end of the trial 20kg of onions were taken randomly from the plots, then hand peeled and assessed for thrips numbers and any damage they had caused. Both trial sites showed slightly higher severity of damage, while only the Early Long Keeper planting showed higher incidence in the IPM trials, but the damage was generally minor with none on the outer skin layers. There was a 40% decrease in costs per hectare in the Waiuku trial and a 30% decrease at Puni.



Alana Wallace, Fruitfed Supplies' crop monitoring servicing manager

The trial will be repeated in the coming growing season with one or possibly two onion growers, which Fruitfed crop monitoring servicing manager, Alana Wallace says will further ground-truth the worth of the approach taken. Crop monitoring is relied on to capture accurate data, quantifying both the pest and beneficial or predator species populations, she says. Then a decision process can set the best course of action, which is much more reliable than a rep stopping briefly to look at a crop over a fence, and quickly working out what needs to be done.

Now the proof of concept has been established future trials will take less time to set up, and refinements can be made, especially around spray accuracy.

"We're on a big learning curve," she says.

"We're excited for this year's trials as we have been able to increase the trial area, hopefully offering more insight to its viability."

A key focus of the trials this year is to look at ways of increasing commercial viability through improving mulch spreading methods. She points out that the pipfruit and avocado industries which have already faced up to the need to reduce their reliance on chemical sprays and have found crop monitoring fits in well as part of a move to IPM.

Vegetable growers already using crop monitoring understand the cost benefit and no longer see it as an expense, but as a beneficial practice that quickly lets them know what is happening in their crops, especially when historical weather patterns can no longer be relied upon.

"Crop monitoring offers the grower the ability to make educated decisions about crop management with new levels of information about how nature is helping them protect their crops." ●



LIGHTENING THE INPUT LOAD

Words by Glenys Christian

The first steps have been taken in what is being called a step-change in the approach to crop protection in the horticulture, arable and wine industry sectors.

A new research programme, 'A Lighter Touch', is being developed as a \$27 million government-industry partnership focused on agroecological crop protection to meet future consumer demands. It was launched in June, with programme manager Dr Stephen Ogden already in place and two staff recruited; transitional technical lead, Paul Munro and agroecology lead, Jeff Smith.

"That enabled us to get a flying start," Stephen Ogden says.

They are now working with the 15 different organisations involved as co-investors through three research and extension themes, the first being enduring outcomes, making sure achievements last beyond the end of the programme. The second theme is agroecological crop protection, with a focus on mainstream adoption. The third theme is transition projects, which aim to ensure newer, more targeted crop protection products are available where small production crops may have been at a disadvantage. Another important element is continuing work looking at protecting crops against the development of pest and disease.

Common areas of interest are already being found, with Plant & Food Research for example, looking into different biocontrol agents around the world to check which could be potentially useful in this country. Other areas of interest are biopesticides, new technologies and demonstration work with some sectors where additional trials might be carried out.

Stephen Ogden says the transition to agroecology is a long-term process where New Zealand has a number of challenges such as lack of scale, the prevalent idea that it is difficult to make a move away from traditional crop protection, and few drivers for change. There is also a lack of industry and market pull as well as proof of concept, along with constant pressures on growers to produce crops efficiently and economically while meeting importing country biosecurity requirements.

It is hoped the seven-year Sustainable Food and Fibre Futures (SFFF) Partnership Programme will enable these challenges to be addressed through collaboration, knowledge sharing and funding not previously seen in this country. While the government believes it will help Covid-19 recovery efforts, Stephen says the pandemic has had some impact when it comes to getting the programme underway.

"We're aware growers have a lot of other priorities at present and we've tried to respect that."

But workshops are taking place with different organisations and a Zoom update on progress is scheduled for late September. A website has recently been launched on which growers can sign up for an email newsletter which is already going out to interested parties. ●

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ROBUST PROCESS REQUIRED

Words by Glenys Christian, photo by Nigel Marple

If vegetable growers want to go down the path of eliminating chemicals they have to base their decisions on evidence, says A S Wilcox's senior crop manager, Bryan Hart.

"To have a targeted, selective strategy you've got to have a robust process," he said.

And that's where crop monitoring comes in as part of an integrated pest management (IPM) programme.

"It's easier to have a rough calendar, but there's a cost to that in putting on more chemical than you need. However it may reduce the risk, which is why many growers go down that path. Scouting-based programmes offer the chance to use less chemistry and potentially grow products with lower residues, but may increase the growing risk if you miss something."

A S Wilcox has used scouting for pests in its crops for over a decade as a result of key customers in Europe wanting it to justify the use of crop protection inputs.

"Evidence from the crop was part of the overarching plan to meet those goals," he says.

"And for that you need feet in the paddock and crop scouting."

Another real driver of its monitoring activities really started to grow with the arrival of the tomato and potato psyllid (TPP) in Pukekohe.

"We didn't know what we were looking for but knew we had to get on top of the pest," Bryan says.

A further development in their strategy started around five years ago with what he describes as biobanks, headlands planted with species such as phacelia, which provide a home for a reservoir of beneficial insects.

"That increases our control about 60 metres into the crop and so is a good opportunity to combat them at the border."

It's used now where there are wasted areas or corners of paddocks and is particularly helpful with main crop plantings at Matamata in the high pest pressure period in the heat of summer.

This has been a useful tool in the toolbox supporting an IPM programme to control both potato tuber moth and TPP.



Bryan Hart – cost in growers only having a rough calendar for spray applications

And with onion thrips the company worked with Plant & Food Research entomologist, Graham Walker, on an IPM programme to manage insecticide resistance.

"That's still a major problem but we have thresholds we're working to," Bryan said.

"We're targeting the right time to apply spray so we're not taking out other beneficial predators."

Amongst growers there is a wide spectrum of crop monitoring use.

"Some don't do it in a formal way, or they may use a retired grower or local agronomists as a second opinion," he says.

But it's quite a technical job, requiring both rigour and consistency.

“

Growers have got a lot of plates spinning around in the air and they can tick the box by using a crop monitoring service

"Growers have got a lot of plates spinning around in the air and they can tick the box by using a crop monitoring service which is complimentary to what their agronomists and crop supervisors are doing," he said.

And with A S Wilcox now working towards a zero level of chemical residues, structure is all important.

"You can't get there without good information and process." ●



GROW NZ WOMEN SCHOLARSHIP WINNER EXPLORES SUSTAINABLE LAND PRACTICE

Words by Robyn Patterson, Career Progression Manager, Nelson

Nelson grower Kirsty Thomson is using her Grow NZ Women Training Scholarship Award to explore how sustainable land practices can be applied to berryfruit and viticulture ventures.

The scholarship is sponsored by the Horticulture Charitable Trust and Grow NZ Women (Nelson-Tasman).

Kirsty returned to Nelson, where she grew up, to work on the land following a career in graphic design overseas and in New Zealand.

After working locally for four years in various crops, returning to the family property gave Kirsty the opportunity to run the boysenberry side of the operation, with her husband. The more involved she became, the more interesting she found growing boysenberries. Having the opportunity to trial ideas encouraged her.

"I find it exciting doing detail work right through to management," says Kirsty. "I also have a passion for sustainable land practices, such as planning the planting of riparian areas with nectar producing indigenous plants. These attract tui, which drive off fruit-consuming birds such as sparrows and restore ecological balance. The variable indigenous plant heights also moderate airflow compared to straight exotic tree fences."

The Southland Institute of Technology's *Land Based Sustainability Practices* distance course included planning for unused areas of the property. The long-term plan is to plant indigenous plants in the wetland area, which runs along the entire western boundary that alternates between dry and flooded.

"This will reduce erosion, reintroduce indigenous wildlife and aesthetically improve the area, while providing a barrier for run-off," says Kirsty, whose philosophy is to focus on the things she can change.

Soil health, covered in the course, has led Kirsty to monitor more, and change the way soils are treated. "We are trialling humates, carbon-dense natural fertilisers, to improve soil quality which will also improve the long-term health of the crop," she says.



Kirsty Thomson

Opportunities to reduce weed spray in viticulture, while meeting export and local requirements, include the phasing in of shallow cultivations to reduce spraying to once a year. Sheep grazing is also used to reduce grass length after harvest. Both these practices improve soil health.

Protecting the land for future generations is front of mind for Kirsty and she is encouraged by more frequent discussions on sustainable ways to grow food crops.

Kirsty never regrets leaving the city and her design career behind for horticulture. "It's an exciting life having a part to play in every aspect of the business. I would certainly encourage people to consider horticulture as a career."

Kirsty is a member of Grow NZ Women. More information can be found on: <https://www.facebook.com/grownzwomen/>

For a career in horticulture, check out Go Horticulture <https://gohorticulture.co.nz/> for information and jobs, or contact your local Horticulture Careers Progression Manager.

TECHNICAL



THE LATEST INNOVATIONS AND IMPROVEMENTS



40 SPREADING AND
SPRAYING FOR SPRING





HEALTHY FOOD, HEALTHY ENVIRONMENT AND POLITICS



opinion



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

With the upcoming elections various parties are out stamping their mark and trying to make their points of difference in the hope that the public can be swayed to give them the tick in the ballot box.

Over the past few years there has been a lot of attention on improving our air and water quality, with agriculture and horticulture bearing the brunt of the blame for our nation's relatively high per capita greenhouse gas inventory and the pollution of our streams, rivers and lakes. What is often omitted in these conversations is that although we have a population of around five million, our land produces enough food to feed approximately forty million people. Not only do we feed eight times our own human population, the food that we do produce is amongst the safest and has the lowest environmental footprint on the planet.

Over the tenure of this current government, there have been significant changes in legislature in relation to the environment, with the reintroduction and strengthening of the ETS (Emissions Trading Scheme) which the previous government put on hold, and a considerable tightening of rules regarding stock grazing management as far as it affects sedimentation getting into waterways, and fencing off permanent waterways. There has also been a major focus on lowering the amount of nitrogen and phosphorus leaking through or running off our soils, and funding focussed on gathering data on environmental degradation and mitigation strategies.

“

Regional councils are expected to enforce these new rules

In early September the Ministry for the Environment released its Essential Freshwater Package as a response to the National Policy Statement for Freshwater 2020. It largely targets livestock farmers, dairying in particular, in limiting the amount of artificial nitrogen allowed to be applied in a year, fencing off streams and water bodies, and restricting the ability to further intensify land use. For vegetable growers, many of the stringent rules do not apply, but that does not mean that in the future, lobby groups and government will not try and enforce similar rules for intensive horticulture. Already attention is being drawn to environmental

concerns from growers in some catchments such as in Horowhenua. Regional councils are expected to enforce these new rules within their communities, targeting the most polluted waterways first, and it will become compulsory for landowners to have Farm Environment Plans put together by suitably qualified personnel. Fertiliser companies will also be required to report on nitrogenous fertiliser sales.

This brings me to the alignment of the various parties in relation to primary industries and the environment. Three elections ago (in 2011), even though I had no intention of becoming a politician myself, I felt so passionately about this issue that I stood as the ACT Party candidate for Waikato, as they were the only party totally opposed to implementing the ETS. I now see political banners from the New Conservatives stating their opposition to the ETS and their pro-farming stance, whereas National appears to be fairly indifferent to it all. Labour has been a bit more forthcoming in their focus on environmental concerns, possibly acquiescing to the Green Party in their Confidence and Supply agreement, although most in the primary industry would be reasonably happy with the advocacy Damien O'Connor as Minister of Agriculture and Rural Communities has provided.

Come 17 October, it will be interesting to see which way the votes swing and which parties do deals with who to be in the baubles of office. The Green Party supporters who are mainly young, urban and liberal, will be voting for a further tightening of the rules to reduce environmental damage. On their website the Green Party is advocating that Regenerative Agriculture techniques be employed on farms, and for growers there will be challenges on how to grow food with less chemical and synthetic fertiliser use. They are also proposing a tax on some synthetic fertilisers, the continued ban of all genetically modified organisms and are promoting organic farming and growing. The wholesale adoption of organic and regenerative agriculture would result in considerably less food being produced here in New Zealand, with the void filled by countries which do not have the same environmental, labour, and animal welfare standards as us. The planet will be worse off overall, and the stringent food safety standards used here in New Zealand regarding chemical residues and genetically modified produce could fall by the way. Consequently our expectations of eating food that is both healthy and nutritious, as well as being sustainably grown, may be challenged if such ideology is implemented. ●



RIGHT AMOUNT, RIGHT PLACE: CALIBRATING FERTILISER EQUIPMENT



LandWISE



By Luke Posthuma

LandWISE
INCORPORATED

As we come into spring, it is time to check your fertiliser spreading equipment to make sure it is spreading well.

FertSpread is a free online fertiliser spreader calibration tool for broadcast and placement spreaders, developed as part of a LandWISE Sustainable Farming Fund (SFF) project in 2015 with support from the Fertiliser Association and Foundation for Arable Research. Since working with vegetable growers as part of the SFF *Future Proofing Vegetable Production* project, we have updated the online tool to calibrate placement fertiliser equipment as well as broadcast spreaders. Growers can sign up for a free account at www.FertSpread.nz to calibrate and test the spread pattern of their own equipment.

The Calibration

As part of *Future Proofing Vegetable Production*, we identified that applying the right rate of fertiliser to each crop is key to efficient fertiliser use. The right rate is made up of two components – an informed decision on how much fertiliser the crop needs (the nutrient budget), and equipment that is applying the required rate to every row and every plant. Maintenance of fertiliser equipment is essential to avoid variable application.

Is your fertiliser equipment applying the correct rate of fertiliser over its whole operating width? A twin-disk spreader broadcasting fertiliser on 15-metre tramlines must apply a similar quantity of fertiliser to every row over that 15 metres. A precision planter must drop an equivalent rate of fertiliser on every row and plant. The standard for broadacre spreading is a 15% variation for spreading nitrogen fertilisers, but vegetable equipment can and should be more uniform.

Broadcast Spreaders

Broadcast spreading uses a double overlap principle to achieve an even spread pattern. More fertiliser will be spread behind the spreader, and less on either side of the spreader. With overlap from the adjacent spreader passes, the rate can be even across the whole field. In basic terms, the spread (throwing) width is up to double the bout (pass to pass) width. The spread width is mostly determined by the size of the disk and the **spinner revolutions**, while the

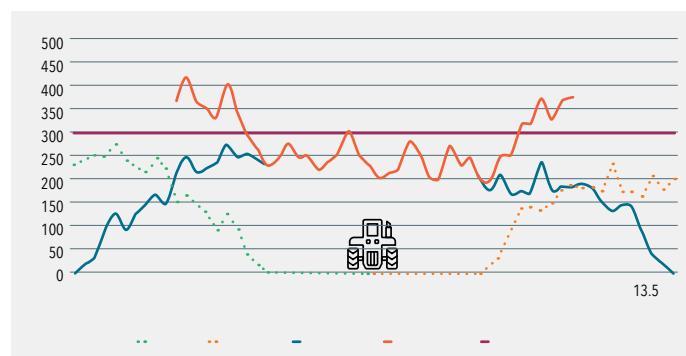
spread pattern is adjusted with the **vane angle** and where the fertiliser is dropped on to the disks (the **drop-point**).

Regular checks include looking for worn parts such as the vanes, as wear will affect the spread pattern. Other issues can occur when fertiliser starts to 'cake on' to the vanes and around the opening door where the fertiliser is fed onto the disks. Fertilisers attract moisture, and a build-up on moving parts can reduce your spreading rate and affect the spread pattern.

Older 'wagtail' spreaders typically perform well to the appropriate spreading width – usually around 15 metres wide. Their design requires minimal overlap for good application uniformity. One issue we see is that when the central bearing is worn, the tail no longer throws fertiliser evenly.



Calibrating a broadcast spreader with a set of fertiliser catch trays in the paddock. Enter details and weights into FertSpread to have calculations done and a report generated.



Planters and Side-dressers

Broadcast spread-pattern graph showing that when overlap is taken into account, the right average rate is being applied, but a mismatch of spreading-width and bout-width means too much is being applied at



Side-dresser ready for calibration using the FertSpread.nz bucket test for placement equipment. Enter details and weights into FertSpread to have calculations done and a report generated.

Placement equipment includes two row banders for the smaller production vegetable growers through to twelve rows or more for large production growers set up for broadacre cropping.

Placement equipment may be ground driven through a drive wheel or PTO (power take-off) or hydraulic driven. To calibrate a wheel driven machine, place buckets under each outlet and turn the drive wheel by hand. For PTO driven equipment, run the stationary tractor at its normal operating revs for a set time. Weigh the fertiliser in each bucket and use the free FertSpread online calculator to determine the application rate (kg/ha) for each row unit and evenness of

the fertiliser across the whole operating width.

To do a quick check before running out into the field, do a quick bucket test as briefly outlined above and weigh the contents of each bucket. If any row units are more than 5 to 10% different from the others, check for a fertiliser blockage or components that need to be cleaned, repaired or replaced.

Calibration Planning

A few quick simple checks through the season will ensure that you are applying the fertiliser at the rate and place it is needed. Growers who regularly maintain and calibrate their equipment achieve the best spread patterns with the correct spreader settings for their equipment. Fertiliser not only adds to costs but can also cause an environmental risk if applied poorly. Calibrating equipment helps ensure the maximum return from your crop.

Our thanks to the *Future Proofing Vegetable Production* project funders, our farmer and grower colleagues and industry supporters. ●

For more information, get in touch to us at LandWISE (info@landwise.org.nz) or check out the online calculator www.FertSpread.nz

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Ammonium N	: 4.9% NH ₄ -N
Total Phosphorus	: 3.0% P
Water Soluble P	: 2.5%
Citric Soluble P	: 100%
Total Potassium	: 20% K Chloride free As Potassium Nitrate
Total Sulphur	: 5.6% S as Sulphate
Total Magnesium	: 1.2% Mg as Dolomite
Micro-Nutrients	
Boron	: 0.01% B
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Manganese	: 0.05% Mn

GRANULE SIZE	
95% 2-5mm Dust Free	

RECOMMENDATIONS FOR USE :	
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Rustica hi K is ideal for Chloride sensitive crops such as Potatoes, Carrots, Onions, Melons, Grapes Tomatoes etc.	

APPLICATION RATES:	
Potatoes	: 500-1200 kg / ha : Application banded at seedbed or broadcast as side dressing
Onions	: 300kg/ha : side dressing from mid bulbing
Carrots	: 3 x 300kg /ha: side dressed from row closure to bulking

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ENERGY EFFICIENCY IN GREENHOUSES



Words by Elly Nederhoff, Crophouse Ltd

Energy is one of the highest cost factors for greenhouse growers, together with labour costs.

There is a drive to reduce the use of fossil fuels in greenhouses and thereby reduce the emission of carbon (CO₂). The objective is to be more sustainable, both financially and environmentally. Financially, it is necessary to cut costs and/or increase income to stay profitable. Environmentally, there are political aspirations to reduce the dependency on fossil fuel and to reduce carbon emission and air pollution. In a new series of articles, we will discuss methods of improving energy efficiency in greenhouses.

Energy efficiency

By far the biggest chunk of energy used in a greenhouse operation is for controlling the greenhouse climate. Firstly, energy (mostly fuel) is used for heating and CO₂ enrichment; secondly electricity is used for powering vent motors, fans, pumps and so on, and thirdly, energy is used for vehicles, sorting machines, work lights, coolstores. Although the third category is important too, it is outside the scope of this series. Our focus will be on heating (for temperature and humidity control) and CO₂ enrichment and using other control devices.

There are various approaches for improving the energy efficiency, such as:

1. Use less energy but maintain the normal yield.
2. Use the normal amount of energy but achieve higher yield and better quality (less rejects).
3. A combination: use less energy and despite that, increase the yield and quality.
4. Replace conventional fuels by sustainable energy sources.

A greenhouse that produces more kilograms per unit of energy (as in points 2 and 3 above) has an improved energy efficiency, which is good financially.

“

By far the biggest chunk of energy used in a greenhouse operation is for controlling the greenhouse climate

Wide spectrum

The New Zealand greenhouse industry involves a wide spectrum of situations:

- Different climate zones: cold winters in the south versus mild in the north.
- Different seasons: winter versus summer, noting that greenhouses also use energy in the summer.
- Different greenhouse types: uncontrolled tunnel houses versus state-of-the-art glasshouses.
- Crops with different temperature needs: for example, lettuce versus cucumber.

We will not address all situations, for instance it is impossible to improve energy efficiency in a heated greenhouse that has no means of control. In contrast, corporate greenhouses probably have taken most energy saving measures and up-to-date knowledge on board. So we will focus on small to medium-large controlled greenhouses.

Greenhouse climate factors

Climate involves several factors such as temperature, humidity, CO₂, light, air movement and more. Tools to manipulate the climate include heating (pipes or hot air heaters), venting, screening, irrigating, fogging or misting, fans, CO₂ enrichment and in some cases lighting. One action can affect many factors. For instance, heating affects temperature, humidity and air movement. Closing an energy screen affects light, temperature, humidity and air movement. CO₂ produced from natural gas generates heat, so indirectly CO₂ enrichment affects temperature, humidity, vent opening, air movement, water use and of course energy efficiency.

Plant physiology

A greenhouse with advanced control and a good computer can create the optimal growing environment. It costs energy, and the challenge is to use it wisely. But what is optimal? Plants respond to their environment in various ways: there is an immediate response as well as medium and long-term responses. For instance, if the sun comes out, immediately the stomata (leaf pores) will open and there will be a sudden increase in water loss (transpiration) and CO₂ uptake (photosynthesis). In contrast, there are slow processes, such as the rate of growth, stretching, leaf area and thickness, the number of leaves that form in a week, formation of flowers, and fruit set. In the long-term, plant shape is a result of slow responses, and is related to the average climate conditions as well as extremes over a period of time.

Dynamics

A greenhouse is a dynamic environment. Conditions change all the time and controllers act swiftly. Plants depend on the greenhouse climate, but vice-versa, plants also affect the greenhouse climate. For instance, active plants bring a lot of water vapour into the air, thus increasing the air humidity and lowering the temperature. You notice this in summer when you walk into an empty greenhouse: it will be very hot and dry. In comparison, a greenhouse with fully grown plants is a lot cooler and more humid even in the middle of summer. Understanding the dynamics between greenhouse climate and plant responses will help towards successful cultivation and improved energy efficiency.

“

Understanding the dynamics between greenhouse climate and plant responses will help towards successful cultivation and improved energy efficiency

Topics on energy efficiency

It will be clear that improving the energy efficiency is not just a matter of installing energy-saving equipment. It is a lot about opting for the right equipment and choosing energy-wise settings in the greenhouse control computer, especially for heating, vent opening, humidity control, CO₂ enrichment and optimal ways of operating an energy screen. In this series of articles, we will discuss several of those aspects, for instance:

- 1 Greenhouse physics: heat trapping, radiation and convection, air movement, humidity.
- 2 The interdependence of temperature and humidity.
- 3 Plant physiology: what the optimal climate is for a plant.
- 4 Temperature effects, long-term, short-term and immediate.
- 5 What air humidity is good for plants, when, why and how.
- 6 The importance of even distribution of temperature and humidity.
- 7 Better use of energy screens.
- 8 Using fans for air movement.
- 9 Combining screens and fans.
- 10 CO₂ enrichment and energy use.
- 11 The 'new way of growing'.
- 12 Biomass as an energy source. ●



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GREENHOUSE CLIMATE PHYSICS

Words by Elly Nederhoff, Crophouse Ltd



Greenhouses have been used for centuries for protecting plants from the elements, as well as overwintering subtropical plants, bringing harvest forward, producing out of season and out of normal climate zones.

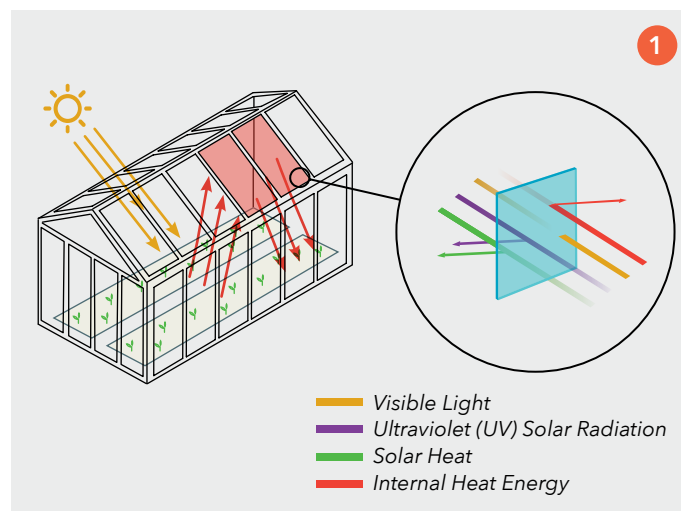
Over time they developed into efficient production facilities where growing conditions are optimised. Temperature, humidity, CO₂, light and shade, air movement and root zone conditions can be controlled by heating, venting, screening, fans, fogging or misting and other methods. This article outlines some physical principles as background to energy-wise climate control in greenhouses, to be discussed in later articles.

Solar radiation

Solar radiation, or sun rays, provide the light and warmth that are crucial for plant growth. **Nearly 50% of solar energy is shortwave radiation (visible light)**, and the other nearly **50% is longwave radiation (heat)**, and a very small part is UV (ultraviolet) radiation. Light is radiation that we can see and that plants need for photosynthesis and growth. Heat is something we can't see, but we feel it. It is important to take into account the difference between solar radiation, light and heat. There can easily be too much **heat**, as too hot is harmful, but it is not often plants get too much **light**. Obviously in solar radiation they go hand-in-hand.

Because plants need light, we cover greenhouses with a translucent material such as glass or clear plastic (polyethylene, polycarbonate, etc). Glass and clear plastics transmit light very well. (To say they transmit light means that they let light go through them). In contrast, for heat (longwave radiation) glass has a very poor transmission; and most plastics have a moderate to low transmission. Ultraviolet radiation is considerably blocked by most materials. Rafters and other construction elements block a small part of all incoming sun rays. It is important that the roof allows plenty of light to come into the greenhouse, but partly blocks heat from coming in. The transmission can be altered by using special covering material, or coatings or screens. And there are some benefits to be gained from the proper use of screens.

Greenhouses trap heat

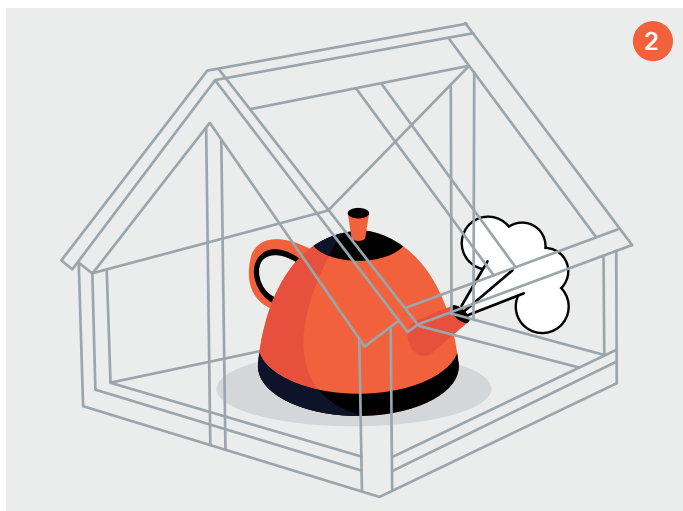


Solar radiation entering the greenhouse warms up the soil, structure, roof, plants and indirectly also the air in the greenhouse. The first advantage is that a greenhouse lets in a lot of solar energy, much more than a building. The second advantage is that a good part of the incoming **light** radiation turns into **heat** radiation. The third advantage is that glass strongly blocks heat radiation, and this works in both directions, so heat radiation stays inside. This also means that heat radiation coming from heating pipes (in cold periods) stays mostly inside. On top of that, warm air cannot easily escape through the roof, unless it is leaking or vents are open. This all means that a greenhouse roof acts as a blanket that traps the heat. The heat trapping ability of a greenhouse is most obvious on a sunny winter's day: without heating but with vents closed, it is much warmer inside than outside. The heat trapping is not perfect though. In cold winter conditions, it may be necessary to use a good energy screen as an extra blanket.

Radiative & convective heat

Radiative heat was discussed above: it is the warmth beaming from the sun. It is also the warming rays beaming from a hot surface such as a radiator or heating pipes. Convective heat is different: it is warmth that is present in a mass of water or air, that can flow from one place to another. For instance, hot air blown out by an electric fan heater is convective heat. Heating pipes in a greenhouse produce both radiative and convective heat. The latter is because air masses flowing along the hot heating pipes get warmer. A warm air mass is convective heat.

Latent heat



A third form of heat is latent heat, which means hidden heat or hidden energy. Latent heat cannot be felt, unlike radiative heat and convective heat. **Latent heat is the presence of water vapour in the air.** Note that water vapour is invisible, unlike fog or mist that consists of small visible water droplets.

The concept of latent heat can be understood by thinking of boiling water in a kettle. After some time and after spending a lot of energy (electricity or gas), the water will be completely gone, evaporated. Evaporation is changing from liquid water to water vapour. The fact that the kettle used so much energy for evaporation shows that water vapour is very energy rich. Since water vapour is invisible, it is called latent energy.

If the evaporation takes place in a small room (or glasshouse), we will see water dripping from the windows and walls. This is condensation that happens when humid air touches a colder surface. By the way, condensation releases energy, but that is hard to visualise. Understanding the difference between radiative, convective and latent heat helps to take smart energy saving actions.

Air humidity

Latent heat leads to the topic of air humidity. Air humidity can be expressed in various ways: relative humidity (in %), absolute humidity (in g/m^3), dewpoint (in $^{\circ}\text{C}$), vapour pressure deficit (VPD), and more. Climate control computers can use any of these forms of humidity, often for different purposes. This will be the topic of a following article, as a starting point for a consideration of energy-wise climate control. ●

1

Heat Trapping

Solar rays enter the greenhouse, where short-wave radiation (light) turns into long-wave radiation (heat). The warmth is more or less trapped inside the greenhouse because glass does not transmit it very well.

2

Latent Heat

Evaporation of water requires a lot of energy. Therefore water vapour in the air represents energy. Real water vapour is invisible and is therefore called 'latent energy'.

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NEW TEST TO IMPROVE N TESTING AND ON FARM NITROGEN MANAGEMENT

Words by Mike Beare, Plant & Food Research

A new soil nitrogen (N) test may be the key to improving nitrogen use efficiency and reducing nitrogen losses.

Plant & Food Research has developed a new soil nitrogen (N) test that provides an improved measure of the nitrogen supplied by soil during crop growth. The new Potentially Mineralisable Nitrogen (PMN) test is faster and more accurate than the Anaerobic Mineralisable Nitrogen (AMN) test (also often called the Available Nitrogen (AN) test) that is familiar to many growers.

The 'gold standard' measure of a soil's potentially mineralisable nitrogen is made from a long-term (14-week) laboratory incubation of the soil under optimal conditions of temperature and moisture, which is not suitable for routine commercial testing. The commercial AMN test was designed to provide a somewhat faster (7-day) estimate of the mineralisable nitrogen, but the results are not very reliable and the test has not been calibrated against the 'gold standard' measure. The new PMN test was designed to provide a simple, rapid test, based on the nitrogen extracted from the soil in hot water. It has been calibrated against the 'gold standard' test and is now available from several commercial laboratories.

The Plant & Food Research team are working closely with Analytical Research Laboratories, Hill Laboratories and Eurofins NZ to ensure consistent and accurate PMN test results.

PMN test values for arable and vegetable cropping soils can vary widely, depending on soil type and land use history. In New Zealand,



PMN tests on continuous cropping soils tend to range from 40 to 120 kg N ha⁻¹ released under optimal conditions. Land recently converted from pasture to cropping can have much higher PMN test values. However, field conditions are rarely optimal, so the Plant & Food Research team have developed a method that uses local soil temperature and moisture data to predict how much of the PMN is actually mineralised from the soil over a growing season.

The Vegetable Research & Innovation (VR&I) Board are partners in a Ministry for Primary Industries (MPI) Sustainable Farming Fund (SFF) Project, *Mineralisable N to Improve On-Farm N Management*, which is testing the application of this method to improve fertiliser forecasting for arable and vegetable crops.

Why N test?

Nitrogen (N) is the most common growth limiting nutrient for most crops. Public concern over increasing N losses to waterways and the atmosphere has increased the focus for farmers and industry groups to continuously improve N management practices.

The most effective way to improve N use efficiency and reduce the risk of N losses is to match N supply to crop

N demand (Fig 1). Crop N demand is the amount of N needed to achieve the crop's target yield and quality.

There are two primary sources of N in soil that are important to predicting the additional fertiliser N needed to meet crop demand during the growing season. The *Initial mineral N* (sometimes called "deep mineral N") is the nitrate (NO₃⁻) plus ammonium (NH₄⁺) in soil at the start of any growing season and is immediately available for plant uptake. The *mineralised N* is the N released (mineralised) from soil organic matter during the growing season.

The N fertiliser required to meet crop demand can be calculated by a mass balance approach where:

$$\text{Fertiliser N} = \text{Crop N Demand} - (\text{Initial mineral N} + \text{Mineralised N}) \quad [1]$$

Although testing for mineral N at the start of the growing season is straightforward, predicting N mineralisation is one of the biggest limitations to estimating the amount of fertiliser N needed to meet crop demand. The new PMN test and methods being validated in the SFF project are aimed at removing this limitation.

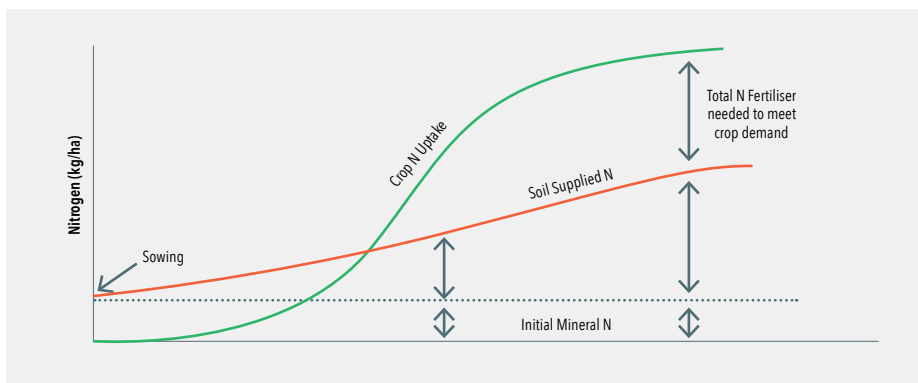


Figure 1. A conceptual diagram of soil N supply and crop N uptake during the development of

The typical pattern of soil N supply and crop N uptake for a spring sown annual crop is shown in Figure 1. In this example, the soil has supplied more mineral N than is needed to meet crop demand in the early stages of crop development, but supplementary N (e.g. from fertiliser) is required to achieve the target yield during the mid to later stages of crop development.

Predicting the fertiliser N requirement also requires information on the initial mineral N content of the soil. Soil mineral N is traditionally measured in the laboratory using soil samples taken from the root zone (e.g. top 60 cm). However, in many situations, nitrate-N is the dominant form (>90%) of mineral N in soil and most of it is concentrated in the top 30 cm of soil. A recent Sustainable Farming Fund project (*Nitrogen – Measure it and manage it*) demonstrated that a rapid, field-based nitrate test (“Nitrate Quick Test”) is a good proxy for laboratory determined mineral N.

Measurements of soil mineral N and PMN provide complementary information on the total soil N supply, and together they can contribute to improved crop N management, with reduced environmental losses. The fertiliser N calculation given in equation [1] assumes that N losses from the soil-plant system during the primary growing season (spring/summer/autumn) are small. While this is generally true, the accumulation of excess mineral N in the soil at the end of the growing season markedly increases the risk of N leaching losses during periods of drainage below the root zone, typically in winter and early spring.

Where do I learn more?

A Ministry for Primary Industries Sustainable Farming Fund Project, *Mineralisable N to Improve On-Farm N Management*, has been established to increase awareness of the PMN test and its use in improving N management. The project aims to verify the predictions made using the PMN test for a wide range of soils, crops and climates.

“Although testing for mineral N at the start of the growing season is straightforward, predicting N mineralisation is one of the biggest limitations to estimating the amount of fertiliser N needed to meet crop demand

Partners and co-funders of the project include MPI, the VR&I Board, the Foundation for Arable Research, Environment Canterbury, the Waikato and Hawke’s Bay Regional Councils, Ravensdown, Analytical Research Laboratories, Hill Laboratories and Eurofins NZ.

Field days will be held at several locations across New Zealand in the coming year. ●

SOIL NITROGEN MINERALISATION

Mineralisation occurs when soil microbes break down soil organic matter to release mineral N.

Depending on soil type, land use history and environmental conditions, mineralisation can contribute anything from 30 to 300 kg of plant-available N ha⁻¹ year⁻¹.

Identifying how much potentially mineralisable nitrogen (PMN) is available to a crop is an important part of good nutrient management practice. Testing for PMN is important to improve fertiliser N forecasting, avoid over-application and the accumulation of excess N, and thereby lower the risk of N losses to the wider environment.

It also offers the prospect of cost savings and lowering greenhouse gas emissions from excess fertiliser N use. ●



For further information contact:
mike.beare@plantandfood.co.nz



ONION SETS: TWELVE MONTHS ON



final word



By Mike Nichols

Some twelve months ago I read the article in the *NZ Grower* by Martyn Callaghan (Callaghan, 2019) on using onion sets to produce onions in New Zealand.

As a result of this article I wrote a short account of my experiences (Nichols, 2020), and later met with Martyn in Pukekohe, who kindly showed me the work he was doing on the subject. This included producing onion sets in the field and in a plastic greenhouse, as well as growing sets on to produce bulb onions. I was most impressed.

As a result, I decided to undertake a small study of my own. This involved obtaining a number of different varieties from Kings Seeds, and some Early Long Keeper seed from A S Wilcox Ltd.

The seed did not arrive until late October, so was sown outside in seed trays in a potting medium, in order to ensure that they might produce baby bulbs (sets) that summer.

Early Long Keeper was also used for a small density experiment in order to determine what might be the best plant density to use for onion set production. The onions were sown on 1 November, and harvested in early February when the tops had died down. It was a warm summer, and the plants were irrigated and fertigated regularly.

The plant density study involved seed at five distinct densities (from 1,000 to 9,000 seeds/m²), while the different varieties were all sown at about 2,000 seeds/m²). In fact, big variations in germination and seed weights of the varieties produced a wide range of plant densities.

Variety trial

Only Pearl Drop, Purplette, Early Long Keeper and White Sweet Spanish produced bulbs, either due to the late sowing or the high plant density, so this is clearly an experiment to undertake again this year, with earlier sowing dates and a range of plant densities.

Plant density study

There was a clear-cut relationship between plant density yield per m² and mean weight/bulb. (See Figures 1 & 2).

The question then arises as to what is the optimum size of onion set to plant in the spring?

“

The question then arises as to what is the optimum size of onion set to plant in the spring?

Obviously the larger the bulb the more capital, and hence the faster growth in the spring, but the cost of producing each set will be higher, and the risk of the onion going to seed in the following summer far greater.

It may be possible to overcome this by a short high temperature treatment of the set just prior to planting, but then economic considerations come into play.

So where to from here?

Currently the sets are being stored at 2° Celsius and the plan is to:

- 1 Plant sets of all the different varieties in early October to see how they perform.
- 2 See how Early Long Keeper will perform when different size (weight) sets are planted in early September, October and November.
- 3 Sow seed of a number of different varieties in September, October and November at a range of different densities, to obtain sets for future years of different weights.



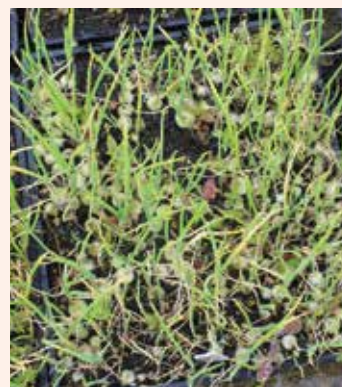
Onion sets outdoors at Pukekohe.



Onions sets planted too early.



Onion sets density experiment.



Onion sets variety Pearl Drop.

Thoughts for the Future

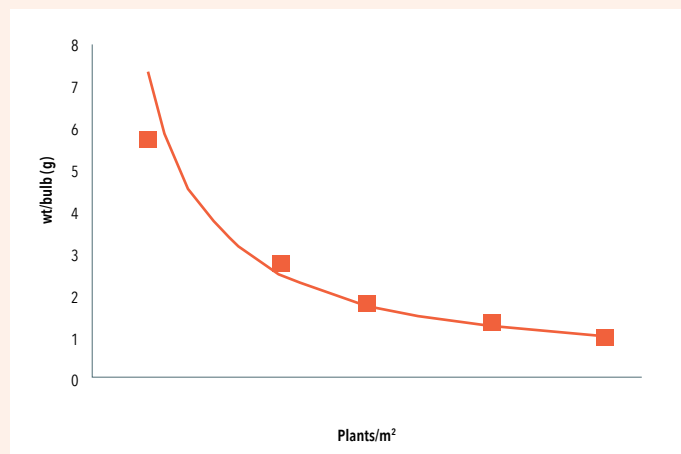
Clearly it is possible to produce onion sets of Early Long Keeper and some of the other varieties in some three months outside during the New Zealand summer. The varieties which failed to bulb might also be successful if sown earlier and/or at lower densities.

High tunnels might provide a far more reliable production system.

Research is clearly required on the effect of planting date and size of sets to determine the optimum economic combination for the production of bulb onions. For example, if there is a premium market for large onions then these might be achieved by growing large sets, planting them early following high temperature during storage to prevent them going to seed.

Because of the high density at which sets are produced (e.g. about 2,000 plants/m²) this suggests that plant factories (vertical farming) might be able to achieve a more efficient production system in a far shorter time. With optimum temperatures, carbon dioxide levels and long days (22 hours?) eight to ten weeks from sowing to harvest should be easily achievable at any time of the year. It would thus be possible to produce five or six crops of sets per year, which could then be easily stored until field planting time in the spring.

Figure 1. Effect of plant density on mean set weight.



Conclusions.

Using sets would greatly assist onion growers to establish the desired plant population while at the same time allowing the ground to be prepared for planting in the spring rather than in mid-winter.

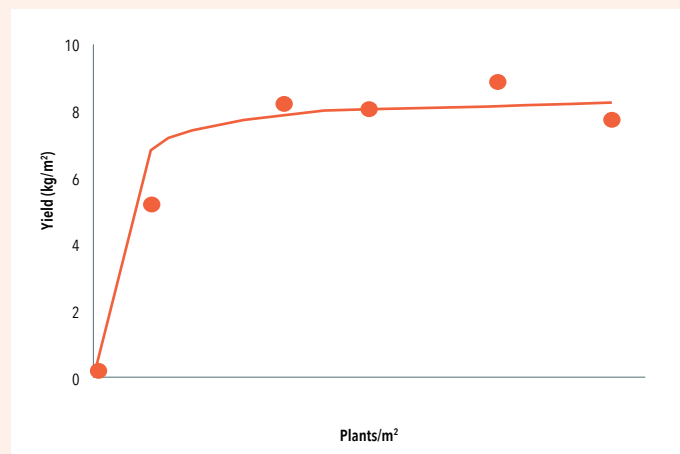
“Using sets would greatly assist onion growers to establish the desired plant population while at the same time allowing the ground to be prepared for planting in the spring rather than in mid-winter

This would possibly allow a green manure crop, and also a reduction in fertiliser leaching, and easier control of weeds, pests and diseases. ●

References:

- Callaghan, M (2019) "Sets: a possible 'paradigm shift' for onions", NZ Grower 74 (7) 14-15.
Nichols, M A (2020) "The Final word: Onion sets", NZ Grower, 75 (3), 42-43.

Figure 2. Effect of plant density on yield





LA NIÑA DECLARED

Words by Georgina Griffiths, MetService Meteorologist



15 September 2020

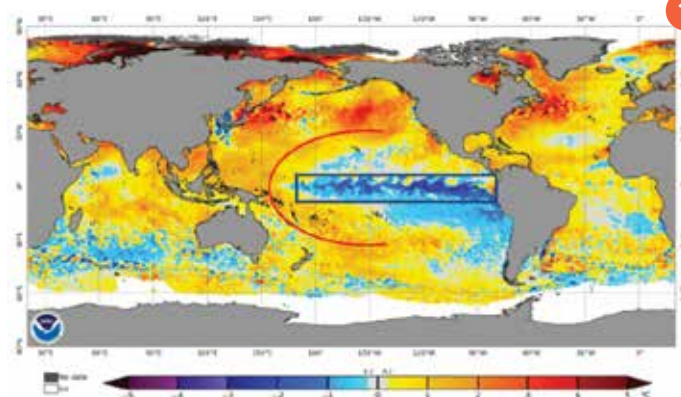
La Niña conditions are now present (observed) in the tropical Pacific Ocean. During the last few weeks, sea surface temperatures (SSTs) along the equator have continued to cool (Figure 1). The monthly NINO3.4 SST anomaly (measured between longitudes 120°W and 170°W) was -0.6°C in August, exceeding La Niña thresholds.

Global climate agencies also noted a coupling in the ocean-atmosphere system, consistent with La Niña conditions, declaring that La Niña is now in place.

Short term factors

In the short term (through until October), the resurgence of the spring westerlies, interspersed by intense Highs over New Zealand, will matter more than La Niña.

In addition, at the time of writing, drier than normal conditions for many parts of the lower North Island, as well as notable dryness in the north and east of the South Island, are becoming a concern as we move further through spring (see Figures 2-5). At the time of writing, year-to-date rainfall accumulations at Pukekohe are sitting at 73% of normal, with Taupō sitting at 69%, and New Plymouth at 83% year-to-date normal.



Blenheim year-to-date rainfall accumulation is currently sitting at only at 60% of normal, with Ashburton at 68% of normal.

La Niña - what does it mean longer term?

La Niña conditions are expected to continue through spring and into summer. At this early stage, forecasters favour a 'borderline' moderate strength event.

La Niña becomes an important driver for New Zealand over longer durations (for example, across two to six months), when moderate or strong La Niña events are in force.

Although every La Niña event is different, you can plan for certain types of weather patterns to play out more frequently than usual.

During a typical La Niña late spring and summer, more Highs than normal lie over the South Island, as well as east of the country. This usually leads to below normal rainfall across much of the South Island. Easterly winds are more common than usual across the upper North Island during La Niña, with fewer westerly regimes across the lower North Island. Often, but not always, above normal summer and autumn rainfall is observed over the far north of New Zealand (Northland, sometimes Auckland, Coromandel, parts of the Bay of Plenty, Gisborne, and sometimes Hawke's Bay).

As always, keep up to date with our latest thinking via the MetService long-range commentary at <http://metservice.com/rural/monthly-outlook>. ●

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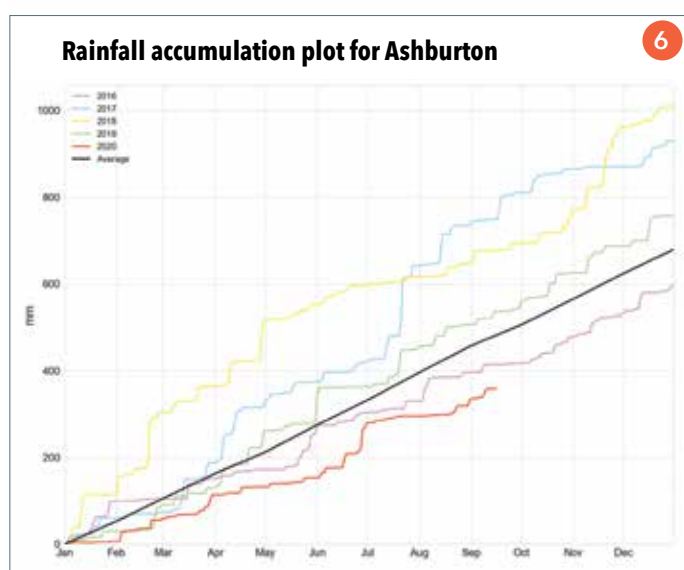
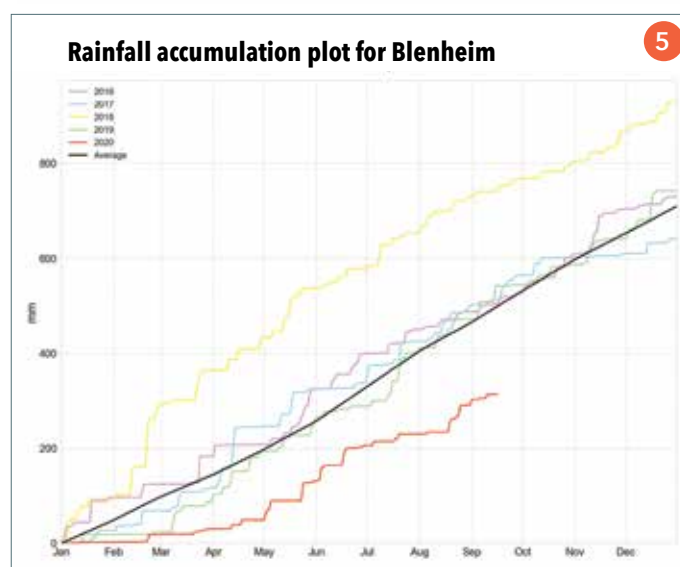
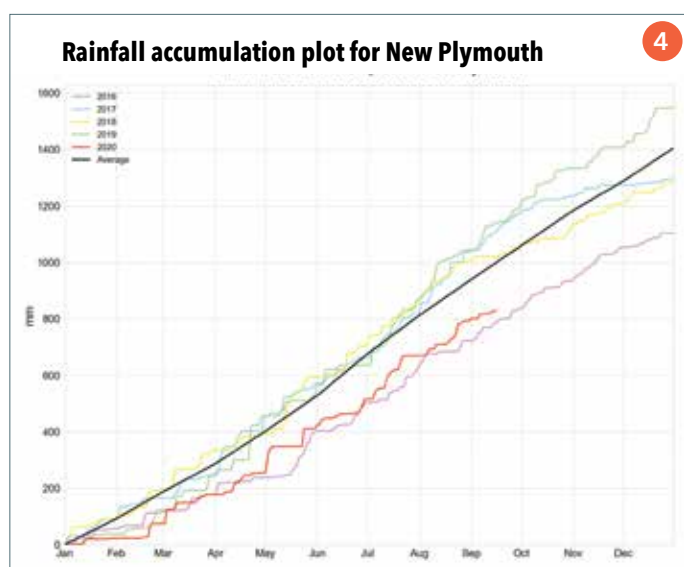
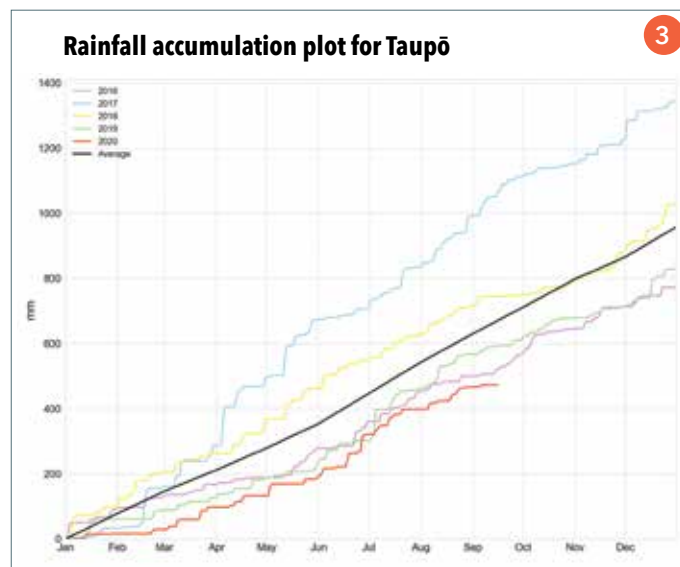
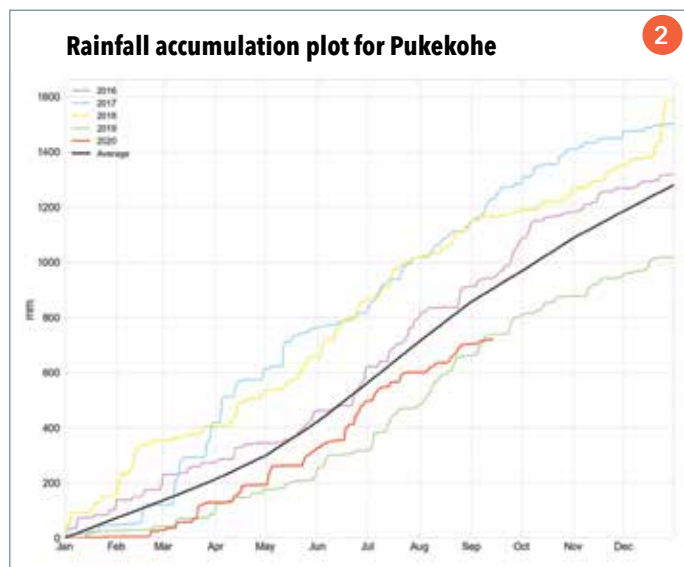


Figure 1: A snapshot of sea surface temperature anomalies (deviation from normal), as at 13 September 2020. Blue colours indicate cooler than usual seas; red colours indicate warmer than usual waters. Data are presented at 5km resolution. Image is courtesy of NOAA (US National Oceanic and Atmospheric Administration). This image shows the characteristic La Niña 'cold tongue' (blue box, centred along the equator), surrounded by the typical La Niña 'warm horseshoe' (red curve).

Figure 2: Pukekohe annual rainfall accumulation (mm) for the last five years (2016 to 2020). The annual average rainfall accumulation is shown in black.

Figure 3: Taupō annual rainfall accumulation (mm) for the last five years (2016 to 2020). The annual average rainfall accumulation is shown in black.

Figure 4: New Plymouth annual rainfall accumulation (mm) for the last five years (2016 to 2020). The annual average rainfall accumulation is shown in black.

Figure 5: Blenheim annual rainfall accumulation (mm) for the last five years (2016 to 2020). The annual average rainfall accumulation is shown in black.

Figure 6: Ashburton annual rainfall accumulation (mm) for the last five years (2016 to 2020). The annual average rainfall accumulation is shown in black.



MAHINGA KAI AND FARM ENVIRONMENT PLANS

Words by Rachel McClung, environmental policy advisor, Horticulture New Zealand and Makarini Rupene, Poū Matai Kō, Environment Canterbury



Do you have freshwater crayfish in your drain? Lizards in your flax? Whitebait in your creek?

There is a term for these treasures and the habitats that support them – in Māori, it is mahinga kai.

Mahinga kai literally means 'to work the food' – which is basically what farmers and growers do, usually with domesticated plants and animals rather than their wild cousins.

In Canterbury, Farm Environment Plans (FEPs) are now required to consider mahinga kai values and identify actions to mitigate impacts on them and/or enhance these values. The recently gazetted National Policy Statement for Freshwater Management (NPSFM 2020) also lists mahinga kai as a compulsory value to be considered in plan making. Therefore, mahinga kai will be a value to be considered in FEPs across New Zealand in coming years.

What is Mahinga Kai?

Mahinga kai consists of geographical locations and species such as natural habitats, materials and practices used for harvesting food, and places where food or resources are (or were) gathered. This includes:

- All waterways, drains (with water or without water), wetlands and springs.
- Native vegetation and riparian areas.
- Areas with specific mahinga kai species and their habitats.

Mahinga kai species are largely indigenous plant, bird and fish species and their ecosystems and habitats.

Because mahinga kai refers to numerous species and inter-relationships rather than something specific, there is no one list of exactly what is and isn't mahinga kai for any given property.

Mahinga kai areas are likely to be those special areas of your property that you are already actively taking care of for their environmental significance or their biodiversity, but some small things living in their natural habitat that you were not aware of could also be mahinga kai.

Risks to Consider for Growers

Nutrient Management

Mahinga kai habitat and species are sensitive to nutrient inputs. Nitrogen and phosphorus losses to waterways can cause undesirable plant or algal growth, degrade habitat, and create risk for human consumption of mahinga kai species.

The proximity of land-use to sensitive environments like rivers, lakes and wetlands, as well as drains, is important to manage, while high groundwater levels and flood prone areas can increase the risk of overland flow of nutrients into water, as well as leaching as a result of oversaturation of soils.

Riparian and wetland areas provide buffering, shade and habitat for mahinga kai species, and can help protect water quality by reducing and absorbing overland flow of nutrients and sediment.

Good stewardship over waterways, springs, lakes and wetlands is key to managing the health of mahinga kai values.

Waterbody Management (including drains, springs and wetlands)

Drains are part of the network of waterways and are particularly important for indigenous fish species. The drains are required to drain land, but also function as mahinga kai habitat. All drains are naturally existing waterways or former wetland areas that supported, and continue to support, sensitive mahinga kai species. These waterways and wetlands will have been highly modified to make way for agriculture.

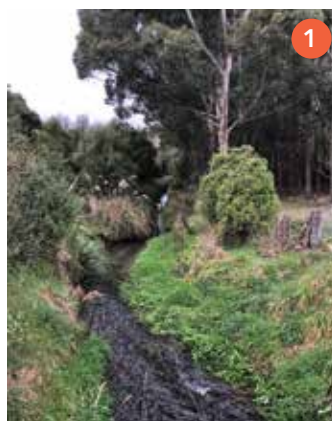
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The management of drains can also directly impact on how safe mahinga kai is for food gathering

Drains are a receiving environment for nutrient, effluent and sediment run-off as well as a contributor to the health of downstream receiving environments because they drain land. Drain cleaning to maintain drainage functions can impact heavily on mahinga kai species by causing fish stranding and death, as well as increased downstream sedimentation. How drains are managed has a direct impact on water quality, lake and river health and mahinga kai habitat. The management of drains can also directly impact on how safe mahinga kai is for food gathering.

Example: Placement of riparian planting

Planting on the sunny side of the stream assists to block out the sun, helping to keep the water cooler for indigenous fish and invertebrates, as well as suppressing weed growth. Also, allowing a stream to meander rather than running straight provides better habitat for indigenous species and slows the water flow, helping to prevent bank erosion. These measures enhance mahinga kai values. Note the meandering stream alignment and planting on the north bank in Photo 1.



Pacific King

This very popular early and main season pumpkin produces a 3-3.5kg fruit with grey skin and bright orange flesh. Small blossom scar and seed cavity. Very adaptable with excellent storage.

Aztec

A sutured rock melon with light rosey net and medium seed cavity. Strong vine with good canopy cover. High fruit numbers of 1.6-2kg with great flavour and brix of 12-14. Good shipping and storage ability. HR: Fom:0,1,2, Px:1,2, Gc:1,2

Jingle

Medium maturity bunching carrot with dark foliage, strong tops and good attachment. Root shape is 80-150mm long and 15-25mm at the shoulder. Great colour and very uniform.



Wetlands and their associated springs are highly valued by iwi, as they can contain the most diverse range and abundance of mahinga kai species. Wetlands also function to protect the water quality of the rivers and lakes by buffering and filtering the effects of land use before they reach these environments. Protecting remnant wetlands as well as developing new or constructed wetlands to help mitigate and/or treat land-use impacts is a key method of protecting and enhancing the habitat that mahinga kai species need to survive.

Irrigation Management

Mahinga kai habitat, species and sites are dependent on optimum water quality and quantity. Irrigation, particularly inefficient irrigation systems, can reduce flows in spring-fed waterways, such as those around Te Waihora, which reduces the available habitat for fish species, and can also result in ponding, run-off, and leaching of contaminants into surface water.

Soil Management

Maintaining or improving the conditions of soils to avoid the movement of sediment, phosphorus and other contaminants into water protects lake health and mahinga kai habitat and species.

Vegetation Clearance

Vegetation clearance for farm expansion, drain cleaning, or other land use can lead to the loss of indigenous and mahinga kai plants, birds, fish, as well as habitats that are an integral part of the lake environment and ecosystem.

Vegetation clearance can also contribute to soil erosion, and sediment and chemical inputs to waterways or lakes, impacting on water quality and mahinga kai habitat.

Indigenous plant and animal communities and their habitats are essential to mahinga kai values. Managing the effects of land use on biodiversity is necessary to enable lakes and rivers to support a healthy diversity and abundance of mahinga kai species.

Protection and Enhancement of Mahinga Kai Values on Farm

Actions to enhance mahinga kai and biodiversity values on farm may include:

- Protecting natural wetlands and springs from stock and farm activities.
- Protecting areas of remnant native vegetation and habitat, particularly trees and shrubs, as well as any riparian, wetland and/or forest vegetation.
- Maintaining sufficient riparian buffers alongside waterways (including drains), wetlands, lakes and springs to manage risks impacting on mahinga kai species.
- Use of native vegetation to restore areas of vegetation disturbance and to stabilise banks and control erosion.
- Development of new or constructed wetland areas to treat and filter run-off, absorb nutrients and trap sediment, and to provide habitat for mahinga kai species as well as a buffer between land use and waterways.

Actions for FEPs

If you are implementing Industry-agreed Good Management Practices (GMPs) you will already be starting to manage effects on water quality and helping to protect mahinga kai. The industry-agreed Good Management Practices are available at: <https://www.hortnz.co.nz/our-work/natural-resources/GoodManagementPractice>

“

Managing the effects of land use on biodiversity is necessary to enable lakes and rivers to support a healthy diversity and abundance of mahinga kai species

However, you now need to also think about addressing the risks to mahinga kai values when implementing these practices. This will include identifying mahinga kai values on your farm and the GMPs that you are carrying out that mitigate impacts and/or enhance mahinga kai values.

Can I get help?

Your FEP advisor can help you with identifying mahinga kai values. Also, you can ask your Regional Council for assistance. If you are growing in Canterbury and want help with identifying mahinga kai values on your farm, assessing risk and developing appropriate practices, advice is available from one of your region's Pou Mātai Kō (Cultural Land Management Advisors). Growers can book an appointment with them to discuss mahinga kai values and obtain on farm advice. ●

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THE IMPORTANCE AND BENEFITS OF BUILDING UP THE SOIL QUALITY IN HORTICULTURAL PRODUCTION

Words by Joachim Nachmansohn

Just like our inherited traits such as hair and eye colour, soil quality is an inherent character of soil.

Basically, soil quality is the soil's ability to function and these functions are critical for the larger ecosystem – plants, animals, humankind, the whole environment. Maintaining traits in this time and age is optional, as we have the ability to alter them, and this applies to soil as well.

Horticultural production whether for subsistence or for commercial benefit is a million-dollar business and the number of producers is expanding both to meet the needs of the domestic market and ever-growing export demand. Currently, about 80% of the land available for horticultural production in this country is being utilised. Therefore, the major focus is now on improving yields and the quality of produce, in order to further the utility of the area. The industry is always on the lookout for innovations and new methods of meeting the demands of the market. With improved production and quality in mind, this article focuses on how to build a quality soil in open field cultivation, and its benefits to the horticultural industry and the environment at large.

What is considered a quality soil

To understand the quality of the soil, the activities that improve or impair the performance of soil functionality must be investigated. Improving soil quality involves activities that optimally balance parameters such as organic matter, nutrient availability, soil pH (acidity or alkalinity), compaction and salinity. Building soil organic matter is critical, as organic matter is a good indicator of soil health. Being negatively charged, organic matter serves as a reservoir of nutrients. In the same way that opposite magnetic poles attract, organic matter attracts the positively charged ions known as cations (which is a subset of the following plant nutrients in the soil: calcium (Ca), magnesium (Mg), potassium (K), zinc (Zn), copper (Cu), boron (B) and manganese (Mn). Cations held in the soil are slowly released to plants, as illustrated in figure 1. Moreover, they improve the water holding capacity of the soil and create a conducive environment for microorganisms. Different activities carried out by humans enhance or reduce organic matter levels in the soil. However, building organic matter in soil takes time and thus needs to be planned. Activities such as adding compost or manure, use of cover crops, practicing crop rotation, minimising tillage and agroforestry have been found to increase organic

matter content in the soil, while removal of crop residues and burning tend to reduce organic matter levels.

For improved soil quality, the soil needs to be protected against erosion, which renders the soil unproductive and thus of poor quality due to the removal of the top soil. It is in the top soil that nutrients are available to plants and therefore removing it means having a sterile soil that cannot support any plant growth.

Soil pH determines the availability of soil nutrients and the activity of microorganisms and so is an important indicator of soil quality. It is therefore important that an ideal soil pH is achieved. Research over the years has found that different crops have different soil pH thresholds, so it is important to determine the pH needs of a specific crop then try to adjust it accordingly. However, the rule of thumb from a pure plant need perspective is a pH between 5.5 and 6.0.

Additionally, soil compaction is a silent enemy that is rarely identified but is an important indicator of soil quality. A compacted soil cannot hold as much air or water and so is of poor quality, as illustrated in figure 2. Compaction can be managed by using soil conditioners such as agricultural gypsum and by reducing tillage of the soil.

Plants do not do well in soils with a high salt concentration. Soil salinity affects the functionality of the soil by interfering with the osmotic potential of the soil solution; instead of allowing the crops to extract water from the soil, the saline soil extracts water from the plant. Salinity also disturbs the nutrient balance, as from a chemical perspective nutrients are a form of salt.

Why build soil quality?

We strive to build the soil quality for a balanced ecosystem. Literally, without soil there is no life, and thus poor quality soil means poor quality life. Quality soil will ensure that plants have their nutritional and water demands met, and microbial activity is increased, all of which is necessary for optimal production. Nutrients are made available for the plants gradually through the slow process of mineralisation. A quality soil can hold more water, guaranteeing water availability to plants. When soil is well managed, crop production can continue irrespective of the season. It is therefore critical to build quality soils for sustainability in the production of food and for continuity of water supply.

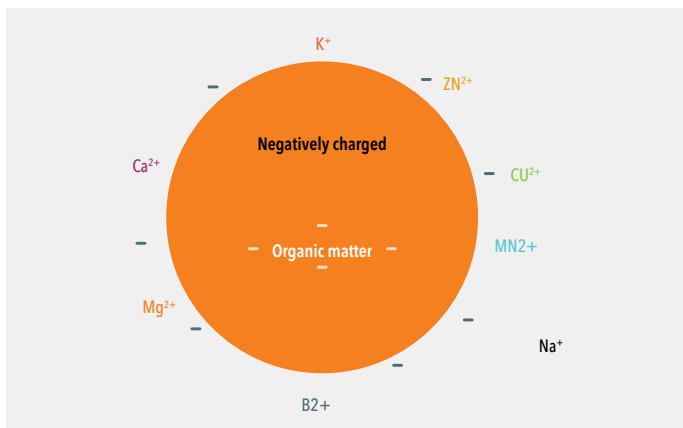


Figure 1: illustration on how organic matter acts as a reservoir for nutrients

Organic carbon acts as a sponge that absorbs nutrients needed by plants. These nutrients (illustrated by the chemical short forms) are then released slowly to the plants when the demand is created.

How to build soil quality

For good crop management it is imperative to maintain quality soil and continue to enhance its abilities. Quality soil can provide nutrients to the plants, can withstand drought and flooding, is free of plant pathogens and at the same time has robust microbial activity, can supply water to plants and provide firm ground for plant support. The first requirement is building soil organic matter of high quality, which is considered the heart and foundation of productive soils. Building up organic matter in soil is a way of improving crop yields. How do we then go about this? First, consider reducing tillage; this will minimise disturbance of the soil's physical, chemical and microbial activities. Instead practice leaving crop residues behind. The higher the yield, the higher the level of residues that will form quality organic matter. Therefore, managing the system with inputs to maximize outputs is key in improving the soil quality.

Secondly, the soil requires some diversity, so practice crop rotation as much as possible.

Additionally, it's important to protect soils from erosion and increase their stability. Consider planting cover crops and catch crops, and put in place measures that prevent erosion by creating diversions to serve as water paths.

Finally, in these times there are many interesting types of biostimulants and soil conditioners that enhances soil quality; everything from adding engineered organic matter to inoculating microbes that enhance soil properties and yield levels. Definitely something to consider, as the well tested biostimulants and conditioners can provide a good cost-benefit ratio.



Soil requires some diversity, so practice crop rotation as much as possible

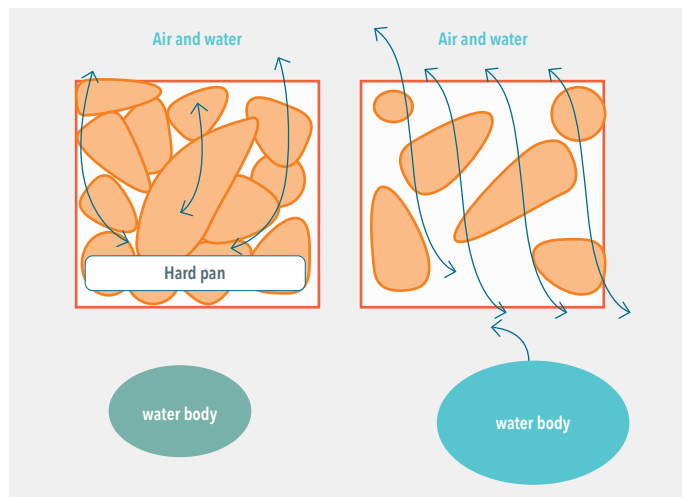


Figure 2: Illustration on the effects of soil compaction

a. Compacted soil b. Uncompacted soil

Figure 2a is a compacted soil that do not allow free movement of air and water into the soil, instead due to compaction, a hard pan is created blocking the flow of air and water. As a result of this, water tend to get waterlogged making the plants susceptible to pathogen attack, restricted root growth. In such a soil, crop yield is greatly reduced.

Figure 2b is a well-conditioned soil, allowing infiltration of air and water into the soil. The water drains freely and the excess seeps into the underground water body which is then channeled to streams, lakes etc. for use by animals and human.

Benefits of building soil quality

Good quality soil ensures continuity in horticultural production. Irrespective of weather extremes, when crops are grown in healthy soil they can withstand the weather effects of the different seasons.

Quality soil ensures safe and improved crop yields enough to meet the food demands of the domestic and export markets. With nutrients more available in the soils, the cost of purchasing fertilisers is reduced, cutting the costs of crop production, and when plants have proper nutrition they tend to be resistant to the attacks of pests and diseases, so the cost of purchasing pesticides is also reduced and the pest and disease cycles are also broken.

As soil plays an important role in the ecosystem, a healthy soil enhances air and water quality in the larger environment through improved water storage and air filtration. When the soil is healthy, its infiltration capacity is enhanced thereby storing more water for the plants and the excess seeps to underground water systems. The quality of these factors is beneficial for both humans and animals. Also, when the soil has a good infiltration rate, it can absorb more water. As a result, surface run-off is unlikely to occur, leading to less soil erosion, less nutrient loss and less risk of flooding.

The presence of living organisms is an indicator of a healthy soil. Soil organisms aid in the decomposition of organic compounds found in organic materials and fertilisers into more useful forms thereby limiting their potential to be pollutants. ●



SPRAYER CALIBRATION – THE FIRST STEP IN YOUR PEST CONTROL MANAGEMENT PROGRAMME

Words by John-Paul Praat and Jane Lamb, New Zealand Agrichemical Education Trust

Don't take it for granted that last season's sprayer set up will do for the coming season, or that your sprayer will just keep doing what it has always done.

An annual sprayer calibration is like an oil change for your tractor, it keeps it running smoothly and avoids costly breakdowns or other mishaps during the season. At the very least, the system should be checked for leaks, potential leaks, filters should be checked and cleaned, and pressure gauges and flow monitors checked to ensure they are working correctly. It is also vital to check the quality and quantity of output from each nozzle.

Overall volume application rate, which may either be litres per hectare (L/ha) or perhaps litres per metre row length, should be within 5% of your target rate. Product labels and industry guidelines will help you set the appropriate target volume application rate for your crop and stage of growth. Calibration will pay you dividends during the season by helping to achieve your targets.



Detailed calibration of an orchard sprayer. (Photo Andy Mawley, Fruition Horticulture.)

Why Calibrate?

The purpose of agrichemical application is to apply the correct amount of active ingredient on the target plant, insect, fungus or soil. If you don't calibrate your equipment correctly, you may be applying too little or too much agrichemical, which can lead to problems.

Why calibration is important

If you use too little agrichemical:

- spraying may be ineffective i.e. pests or weeds may not be controlled
- there is a risk of developing resistance to the agrichemicals you are using
- there will be increased risks and costs from control failure and you may have to reapply.

If you use too much agrichemical:

- it is a waste of the product
- there is increased cost
- the risk to you and the environment increases through run-off or drift
- there is increased risk of excess chemical residues in crops.

Sprayer calibration provides you with confidence that the correct amount of spray mix (both product and carrier) is being applied. This information can help ensure you are applying the amount of solution (dose) required by the product label. While operating a calibrated sprayer offers practical benefits by saving time and money and avoiding waste, it also plays a key role in crop management, agrichemical resistance management and maintaining access to markets.

Agrichemicals are an important crop management tool for controlling insect pests, disease and weeds. When there is a control failure, one of the first questions the product supplier will ask is 'was the sprayer calibrated and what are those details?' The supplier needs to ascertain whether the label application recommendations were followed.

Documented calibration procedures showing what measurements were carried out will be required. Desktop or theoretical calibrations will not suffice as they may not reflect actual sprayer performance. These do not provide proof of performance. In some cases where the theoretical calibration has been relied upon and no checks have taken place, it is not until control has failed and it is too late that actual calibration performance is measured and found to be incorrect.

Why a theoretical calibration may not be accurate

Practical issues such as:

- inaccurate tractor speed charts
- tyre inflation different
- surface conditions (wheel slip)
- imprecise flow charts, especially for disc and core nozzles
- pressure measured at the nozzle may not be the same as that measured at the regulator.

Note: Flow meters require calibration even when new and are subject to wear and tear.

Calibration is a key strategy in avoiding development of resistance to agrichemicals. The New Zealand Pesticide Resistance Management Committee states that “the right product must be used at the right dose rate at the right time and applied to the right place to avoid development of pest or weed resistance to agrichemicals”. Spray coverage is key to resistance management, and calibration is vital to achieving good coverage.

Sprayer calibration is also a prerequisite for access to some markets. NZGAP and GlobalGAP (Good Agricultural Practice) require evidence that the sprayer has been calibrated. Generally, a qualified calibrator must be used i.e. someone holding a Growsafe Registered Calibrator certificate or the Growsafe Advanced certificate if calibrating their own equipment.

When to calibrate?

Calibration should be carried out at least annually or after significant changes such as a new tractor, new tyres or a change in crop type or architecture. Calibration will also be required when implementing new techniques such as using low volume application rates or new nozzle technology.

Simple things can catch operators out. For example, concentration is determined by how much product you add to the tank. However, tank sizes can be inaccurate. Before you use a sprayer, you should check the accuracy of the volume marks on the side of the tank. Some tanks can be out by 10%. For example, a 1,000-litre tank may actually hold 1,100 litres, which will mean the spray mix is less concentrated than you have planned. The best way to check volume is by weight. As you fill the tank with water, compare the markings on the side of the tank with the weight added. Livestock scales or a weigh bridge can be used for this. Alternatively, a calibrated flow meter could be used. This type of check is advisable irrespective of tank size, and even knapsacks have been known to have misleading volume markings.

Key factors

The key elements determining the amount of agrichemical applied are:

- Flow rate – This is affected by the type and size of the nozzle and by the pressure. Higher pressure increases flow rate and more spray mixture is applied. Different sized nozzles allow different amounts of spray mixture through; and a worn nozzle will allow more spray mixture through.
- Speed – If the flow rate stays the same, going faster will apply less spray to each target plant. Higher speeds may be used early in the season when canopies have few leaves and lower volume application rate can be used. However, care must be taken not to go too fast and compromise coverage. If a rate controller is being used the target flow rate must also be adjusted. This is usually done by reducing the number of nozzles and/or the sprayer pressure.
- Row width (distance between rows) – The wider the row width, the more area the spray mixture is being spread across.

Health and Safety at Work Act 2015 (HSWA) |
General Risk and Workplace Management Regulations
2016 | Hazardous Substances Regulations 2017 |
Hazardous Substances and New Organisms Act 1996
(HSNO Act) | Hazardous Substances (Hazardous
Property Controls) Notice 2017 | Agricultural Compounds
and Veterinary Medicines (ACVM) Act 1997 | Transport
Act 1998 | Resource Management Act (RMA) 1991 |
Regional plan | Quality assurance
programmes | GlobalG.A.P. |
NZGAP | Industry audit |
Market requirements

?

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Steps in Calibration

Planning – Calibration planning requires knowledge of the agrichemicals, machinery and targets. Whether you undertake your own calibration or use a registered calibrator, you will need to make decisions on what product rates are required, what volume of water should be used and how much coverage is required. Consider the range of set-ups you may need for different plantings within your orchard.

Preparation for calibration – Carrying out some simple tasks before calibrating a sprayer will save time and money when using a registered calibrator. Clean down the sprayer and clean individual nozzles by taking them off (in order) and soaking them. Check tyre pressures of the sprayer and the tractor. Also check that the tachometer is working.

Calibration – Choices need to be made on the nozzle type and size, droplet size, nozzle arrangement, travel speed, use of air, air speed and profile. It also involves some calculations. Templates for calibration calculations are available from industry guidelines and production manuals, NZS8409 (New Zealand Standard: Management of Agrichemicals), Growsafe courses, nozzle catalogues, applications on smart devices from suppliers and the Growsafe website. Calibration training is available through industry programmes. Growsafe's Advanced programme is suitable for those calibrating their own spray equipment, although use of a Growsafe Registered Calibrator is still recommended for complex spraying operations.

Checking – In most spraying operations the spray nozzles are already fitted and travel speeds, output volumes and chemical rates have been established. During spraying, the operator needs to ensure that the target is adequately covered, to watch for leaks and blocked or damaged nozzles, and to confirm that application volumes match those expected. Where the area or row length to be covered is known, it is possible to estimate how much can be treated per tank and how many tanks will be required to treat the area. Operators need to check these expected figures against the actual volume used. For example, if you should be able to spray five rows with a single tank, then you should check your equipment if you run out significantly before or after you have sprayed five rows. Sprayer operators and their managers should keep running totals for each application of area or row length of crop covered and the volume of spray mix used. In this way checks are continuous, comparing target with actual volume application rate to identify any discrepancies. Actual application should be within 5% of the expected or targeted rate and any differences of more than 10% should be investigated and resolved.

There is calibration and then there is calibration

The simplest approach uses a standard dilution e.g. 100ml litre product per 10 litres of water and wet or spray the target to the point of 'wet but no run-off'. Spot spraying with a knapsack is an example of this and calibration requirements are limited to calibration of measuring jugs and the knapsack's tank.

Area-based or boom spraying requires application of an even amount of agrichemical across a target on a known area of land e.g. spraying a paddock of onions. Modern GPS (global positioning system) based controlled systems have improved the accuracy of this process by matching adjacent spray runs, shutting off boom sections or nozzles to avoid overlaps and adjusting nozzle output along the spray boom during turning.

“

When was the last time your sprayer got a complete review?

Canopy-based spraying has the most complex requirements as application rates must be adjusted to match the size and density of different target canopies e.g. increasing rates as trees develop from bare branches to full leaf. Given most orchards have a range of varieties, plant age, row spacings and tree architecture this can be challenging to manage. These adjustments can be automated by canopy sensing and nozzle control systems, but these are not common. Rather, these adjustments require more elaborate calibration in terms of the range of nozzles, pressure and speeds used. Recommendations for applying a rate per metre row length with adjustments for canopy density and height are becoming more common in the industry.

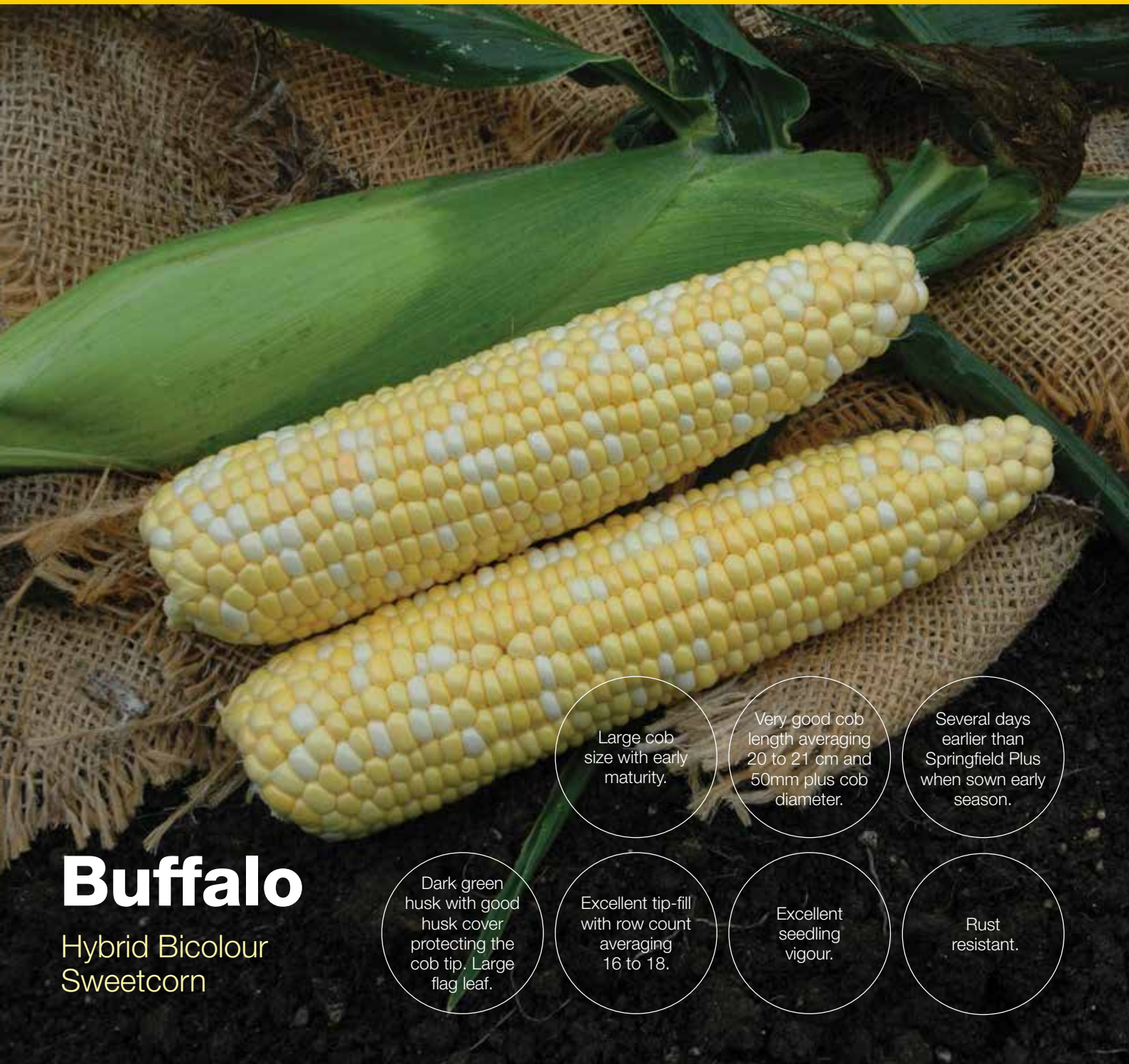
Coverage

In all cases, spray coverage is key. Coverage should be checked, especially for canopy-based spraying. Artificial targets and spray tracers are simple and effective tools for this. Water sensitive papers are the most common and easiest artificial target to use and are available from equipment suppliers. These can be attached to any part of the target or other holder in the canopy and spray is applied as normal. Assess the coverage in harder to spray areas or at specific targets like the underside of leaves in relation to the pest and product being used. Tank products can also be used for visual assessment, including a dye which glows in the dark under ultraviolet (UV) light and kaolin clay which leaves the white clay on target surfaces. The clay washes off in the rain and is harmless, as is the UV dye, but these techniques should not be used in the lead up to harvest.

Conclusion

Savings on agrichemicals, avoidance of resistance to agrichemicals and improved control are all benefits from applying the right amount of agrichemical as a result of calibration. When was the last time your sprayer got a complete review? ●

Thinking vegetable seeds? Think **Terranova.**



Buffalo

Hybrid Bicolour
Sweetcorn

Large cob
size with early
maturity.

Very good cob
length averaging
20 to 21 cm and
50mm plus cob
diameter.

Several days
earlier than
Springfield Plus
when sown early
season.

Dark green
husk with good
husk cover
protecting the
cob tip. Large
flag leaf.

Excellent tip-fill
with row count
averaging
16 to 18.

Excellent
seedling
vigour.

Rust
resistant.



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East Coast & Manawatu Graeme Jackson, Mobile: 021 396 359, Email: graeme.jackson@tnseeds.com

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South Island Roger Banfield, Mobile: 021 352 764, Email: roger.banfield@tnseeds.com

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PRODUCT GROUPS



ALL THE LATEST NEWS FROM YOUR PRODUCT GROUPS



68 POTATO PEST
MANAGEMENT





USING LOCALISED WEATHER REPORTS TO MAKE INFORMED DECISIONS

Words by James Kuperus, Chief Executive : Onions NZ Inc.

Ministry for Primary Industries
Manatū Ahu Matua



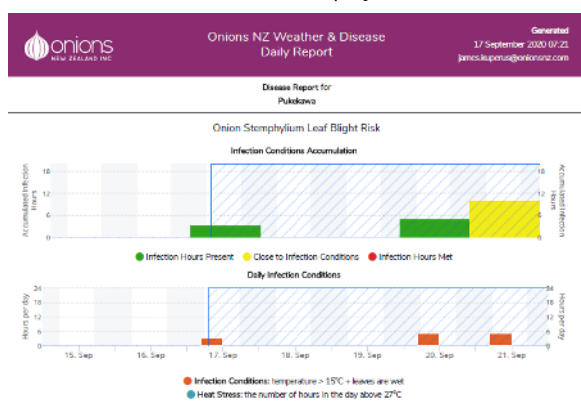
With the support of the Ministry for Primary Industries (MPI), Onions New Zealand can now offer members access to 40 weather stations around New Zealand.

With real time weather data overlaid with disease indicators, members can use this information to make informed decisions about whether the crops should be scouted for disease or preventative sprays applied. The indicators are currently available for white rot, downy mildew and Stemphylium leaf blight.

Onions New Zealand has switched on the ability for members to receive daily reports on the national and local weather with the disease indicators. It is possible for members to receive daily reports for more than one station. For example, if you wish to receive reports for Pukekawa, Bombay and Ashburton, this is possible.

Please contact Brittany McCloy or me if you need assistance. Members can also view live data through the Onions New Zealand website. This piece of work is part of the 'Onion Pathways' Sustainable Futures Fund project to reduce agrochemical residues and applications.

Below is a snippet from one of the daily reports for Pukekawa, which illustrates there is a heightened risk of infection conditions for Stemphylium.

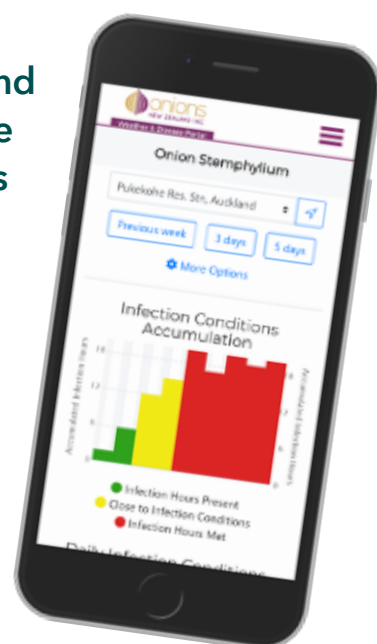


It is possible for members to access historical data from the website as well. So historical weather data can be overlaid with disease pressure indicators. This can only go back as far as the date the stations were installed. For the stations in Bombay, Pukekawa and Onewhero, as they were installed this year it is not possible to view historical data, but for all others it is.

“
Onions New Zealand has switched on the ability for members to receive daily reports on the national and local weather with the disease indicators

This year, Onions New Zealand is investigating overlaying the weather patterns, disease indicators with spray timing to see whether spray decisions align with the weather and disease pressures. These reports will be available to members who send in their spray diaries in the coming months.

The image above is of the Stemphylium indicator viewed via cell phone. ●



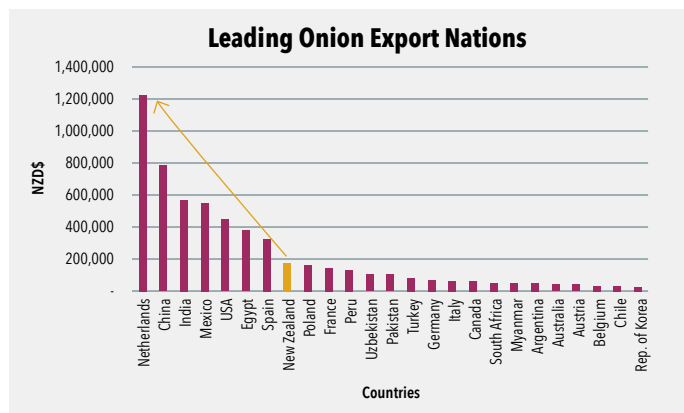


BATTLE OF THE JANUARY TO JUNE EXPORT WINDOW

Words by James Kuperus, Chief Executive : Onions NZ Inc.

We sometimes lose sight of how valuable the global trade in onions is.

In 2019, global onion trade was \$4 billion, compared with the fruit New Zealand is well-known for, the kiwifruit, at \$2.9 billion. In the global onion trade, New Zealand has the eighth highest export earnings at \$172 million nzd, with the top two export nations accounting for approximately 50% of all onion exports. The leading onion exporting nation, the Netherlands, exports to some 150 countries, compared to New Zealand which exports to 43 countries.



Historically, New Zealand alongside Australia has been very successful in trading counter seasonally into the United Kingdom and European Union. In the year 2000, New Zealand was the number one supplier into the United Kingdom exporting 35,000 tonnes to that market, out of a total of 98,000 tonnes. Over the last three years New Zealand has averaged 9,200 tonnes a year, but total UK imports have increased to around 150,000 tonnes on average. New Zealand has slipped three spots to fourth behind Spain (which increased from 18,000 to 56,000 tonnes), the Netherlands (increased from 20,000 to 55,000 tonnes) and

Egypt (increased from 1,000 to 42,000 tonnes) in this market. The likes of the United Kingdom are now being serviced by producers that are much closer geographically, that are able to store their onions for longer. The January to June window has become more competitive with new entrants and storage subsidies in the EU supporting producers to store their onions using controlled atmosphere storage.

The following graph ¹ illustrates the changes in markets for New Zealand from the early 2000s to this year, showing a three-year average from January to June. New Zealand has done well to adapt and find new export opportunities in Southeast Asia in recent years.

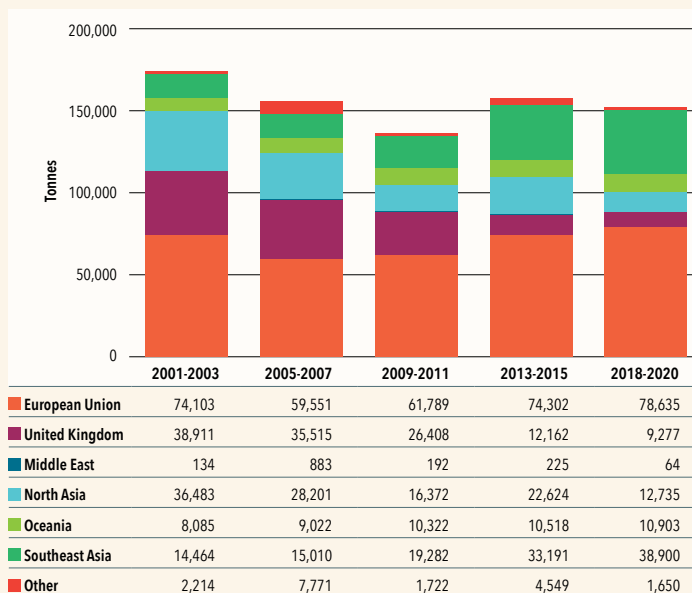
The onion sector has stabilised after this counter seasonal trade into the UK – when compared to our friends across the ditch, who haven't been as fortunate in diversifying out of the UK and EU. The trick for New Zealand will be how to continue the push into Asia where we have been able to expand our presence. The smallest two portions on the graph above are associated with the Middle East and 'other' markets (Russia, the United States, Africa, Latin America). ²

As we move into Southeast Asia, our competitors in the January to June window are now India, China, the Netherlands and Australia. ³, ⁴

Accepting that counter seasonal trade in the January to June window in the northern hemisphere is becoming more competitive, we as an industry need to continue to sustain the push into new markets, or risk a graph that resembles Australia's. With India placing a ban on exporting onions, there is possibly going to be a greater gap in certain markets for New Zealand to push into. As a sector we need to accept these new markets that we are looking to expand into may not pay top dollar currently, and be prepared to work to develop them over five to ten years. ●

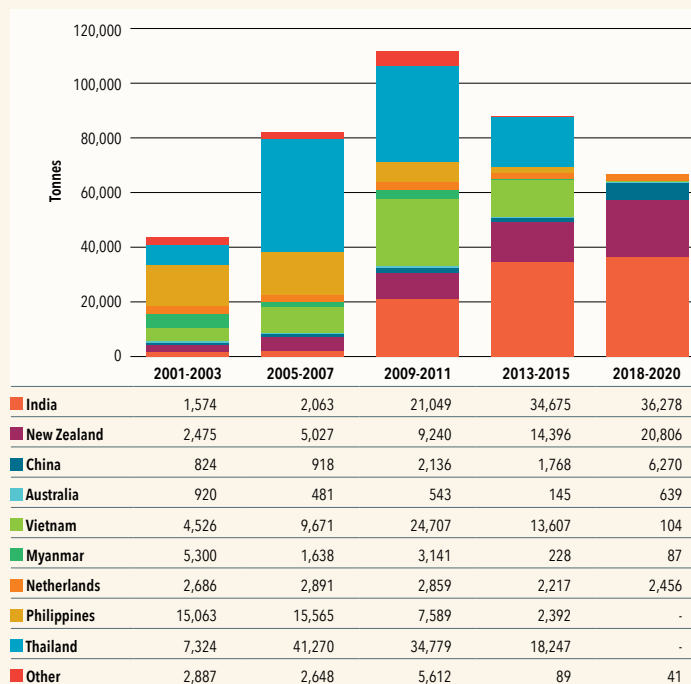
1

Change in New Zealand Onion Exports 3-year avg (Jan-June)



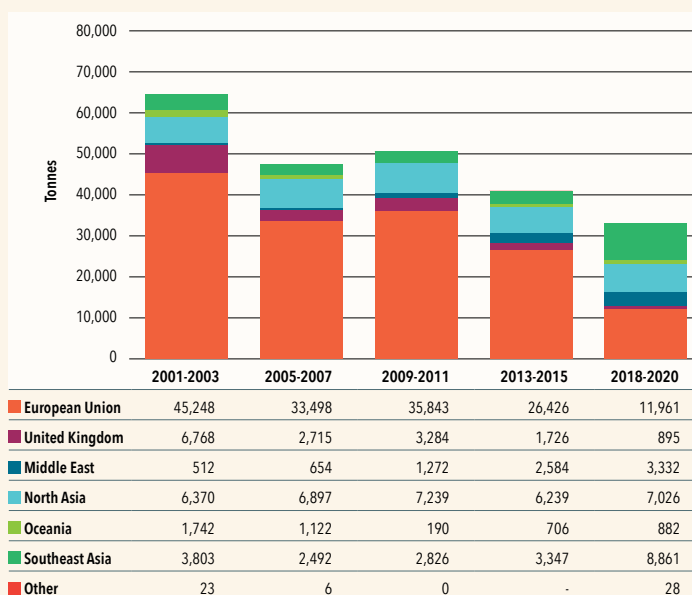
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Indonesian Imports of Onions/Shallots 3-year avg (Jan-June)



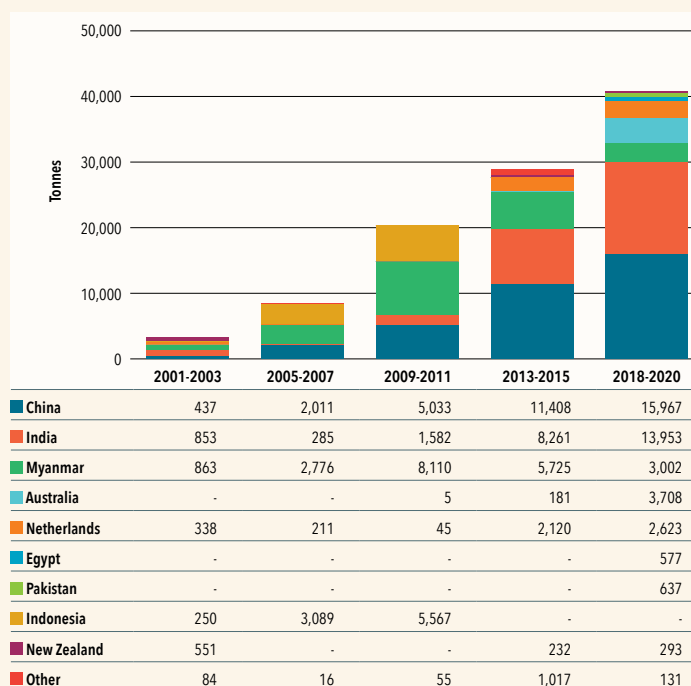
2

Change in Australian Onion Exports 3-year avg (Jan-June)



4

Thailand Imports of Onions/Shallots 3-year avg (Jan-June)





NEW FRESH TOMATO STRATEGY

Words by Helen Barnes : General Manager, TomatoesNZ Inc.

This year the TomatoesNZ Board undertook a review of the industry strategy.

The new vision, purpose and priorities are in the graphic on page 67. A series of actions sits under each priority. A poster outlining those was sent to members last month along with the Annual Report. The priorities and actions will guide TomatoesNZ activities over the next three to five years with a view to “building a resilient, sustainable and profitable New Zealand Tomato industry.”

High tomato prices in the news

In September, Statistics NZ reported that August tomato prices spiked to an historical high of \$13.65/kg.



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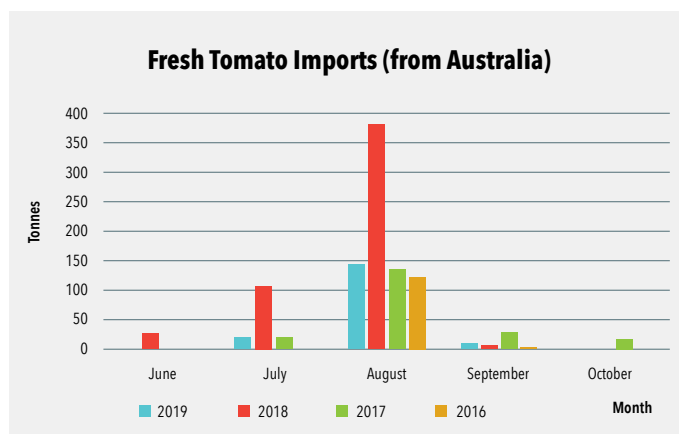
We had the opportunity to explain to Statistics NZ before they issued a media release about the high prices, noting that this was partly due to the uncertainty over sales during Covid-19 alert levels 3 and 4 in April and May. With independent fruit and vegetables stores and restaurants and hospitality closed, many growers reduced or delayed planting. This came through in a TV3 news story reported on the 6pm News on 11 September. The Statistics NZ media release was published by Stuff, who also commented on the impact of recent Emissions Trading Scheme price rises which hit at the same time as the commencement of winter heating, and as the country and growers were only just coming out of Level 3 lockdown.

During 2019 tomato retail prices, based on the consumer price index (CPI), peaked at \$10.68/kg in August. The year before (2018) prices peaked at \$11.03/kg. However if we go back a few years, 2016 prices peaked at \$12.06/kg in late August.

Imports

In 2018, 524 tonnes of fresh tomatoes were imported into New Zealand during the winter, which was higher than usual, and across a longer period than usual (see the graph). Last year imports were significantly lower at 175 tonnes in total. Up to July this year (the latest data we have) there have not been any imports of tomatoes reported. This is likely due to the impact of reduced freight availability, and high prices in Australia too.

TomatoesNZ keeps records of the weekly CPI prices by region for fresh tomatoes, along with import and export figures. If you would like to receive this information, or have any specific queries, please contact us.



Energy articles for indoor growers

We have arranged for greenhouse specialist, Elly Nederhoff, to provide a series of articles on energy efficiency for greenhouse vegetable growers. Elly originally wrote a set of articles on this topic for the *NZ Grower* from 2003 to 2007, alongside a three-year Sustainable Farming Fund project called 'Improving Energy Efficiency in Greenhouse Vegetable Production'.

In the new series which will run over the next few months, Elly has updated the information taking into account new energy efficiency strategies and changes in the last 10 to 15 years. The first article titled “Energy efficiency in greenhouses” features on page 42. We hope these provide helpful information and look forward to your feedback.

Also in the energy space, we are progressing with an online survey which has gone out to all vegetable covered crop growers that we have email details for, so we can better understand growers' current situation and to help look at what options may be best to consider for energy efficiency and lowering emissions in the future. If you would like to receive the survey, or need further information please contact us.

Tomato Red Spider Mite

During spring, a field survey of commercial growing sites across the greater Auckland region is being conducted by SPS Biosecurity. This is to try and determine if Tomato Red Spider Mite has spread throughout Auckland following detections at three sites earlier this year.

We are concerned that this new pest may cause future problems for tomato growers and have been working with the Ministry for Primary Industries (MPI) to arrange this survey which covers both tomato and other vegetable covered crop growers. We would like to thank all growers who have agreed to participate in the survey.

“

Tomato Red Spider Mite is very small – the size of a full stop, so accurate identification requires an expert

Tomato Red Spider Mite is very small – the size of a full stop, so accurate identification requires an expert. The mite got its name because it eats tomato plants, is red, and makes silk webbing to protect itself and its eggs, like some spiders do. It multiplies quickly and in large groups can mummify plants, wrapping them up in silk webbing. ●

More information and pictures are available on the TomatoesNZ biosecurity webpage, and on MPI's website under **Alerts**. If you see any signs or symptoms, please call the MPI Exotic Pest and Disease hotline on **0800 80 99 66**.

TomatoesNZ Strategy



VISION FOR THE INDUSTRY

Tomatoes you love from growers you can trust

PURPOSE OF TOMATOESNZ

Building a resilient, sustainable and profitable New Zealand Tomato Industry



PRIORITIES	TELLING THE NZ FRESH TOMATO STORY, AND GROWING THE MARKET	SUPPORTING GROWERS	BIOSECURITY	ADVOCATING SO GROWERS CAN GROW	INNOVATION & TECHNOLOGY LED SOLUTIONS
DESCRIPTION	Creating a NZ fresh tomato industry narrative; and Increasing domestic and export volume and value.	Providing the tools and knowledge for growers to operate profitable and sustainable businesses.	Preparing for and responding to new pests and diseases. Developing sustainable pest prevention and management.	Engage with regulators to achieve fit for purpose regulation that supports sustainable commercial growing.	Developing new ideas to minimise costs and increase the value.
ACTIONS	This means we will: - Develop and distribute consistent and factual stories of NZ Tomato production systems and the value chain for consumers and government. - Tie our story creation in with the 'Lighter Touch' programme and other projects that support, demonstrate and align with our vision and purpose. - Provide the NZ Tomatoes story to marketers to ensure consistent messaging in market - Work with influencers. - Attract new talent to careers in the industry. - Understand and measure the market and consumer values. - Target increased per capita consumption in NZ based on data. - Support joint initiatives that align with this priority and sell the health benefits (e.g., 5+ a day and vegetables.co.nz, international networks). - Maintain current export market access.	This means we will: - Develop tailored practical programmes that maximise the uptake and benefit of tools and knowledge (e.g., H&S, Food Safety). - Package and communicate 'best practice', such as Agchem compliance information. - Understand how growers prefer to source information & knowledge. - Provide opportunities for networking and learning (e.g., conference, webinars, workshops, field trips and open days). - Facilitate information about, and engage with opportunities for, development of skills & training include career pathways (e.g., apprenticeship schemes, technology transfer, etc). - Crisis management, media liaison and leadership.	This means we will: - Ensure commercially sensible biosecurity outcomes for growers. - Participate in cross sector biosecurity readiness and response (e.g., GIA governance, Deed GG, BMSB, FFC). - Undertake readiness projects with MPI for tomato sector pests, and maintain an awareness of risks. - Awareness of international developments. - Provide relevant tools and information for growers (e.g. Improved hygiene practices).	This means we will: - Engage with regulators to raise awareness of the tomato production system and story. - Collaborate with others who have similar constructive stories and work with HortNZ and other industry groups to advocate on behalf of growers. - Build relationships with influential individuals in key regulator bodies (e.g., MPI, Energy, MBIE, EECA, MfE, EPA, Food Safety, Worksafe).	This means we will: - Pursue labour saving technologies & partner in automation projects. - Explore reduction or replacement of fossil fuels for heating, and energy efficiency. - Develop integrated pest management tools and techniques. - Fully participate in 'A Lighter Touch' programme. - Develop environmental management tools for growers (e.g., for nutrient discharge). - Access international expertise, knowledge & benchmarking. - Facilitate and provide support for upskilling in technology.

JULY 2020

TomatoesNZ



CONTROL OF POTATO TUBER MOTH, *PHTHORIMAEA OPERCULELLA*

Words by Gemma Carroll : Communication & Engagement Officer, Potatoes NZ Inc.



PTM symptomatic leaf



PTM symptomatic tuber



Potato Tuber Moth

As spring and summer draw closer, so too do the myriad of pest and disease management activities that must be undertaken by potato growers. One of the greatest challenges, especially for growers in the Pukekohe area, is the control of Potato Tuber Moth (PTM). The increasingly dry periods we have seen in recent seasons exacerbate the problem, as cracks in the earth provide plenty of opportunity for tuber infection.

Potatoes New Zealand's recently completed PTM literature review looks at the various control approaches to this pest and suggests an integrated approach to PTM management.

PTM originated in South America and has now been recorded in over 90 countries.

The moth feeds on a range of food plants, mainly those in the family *Solanaceae*. The main crops affected are potato (*Solanum tuberosum*), tomato (*Solanum lycopersicum* or *Lycopersicon esculentum*), and tobacco (*Nicotiana tabacum*). In the case of potato, larvae of PTM feed

either on tubers or within the leaves of potato plants.

PTM is primarily a potato field pest. Harvested tubers are not so at risk if they are kept well protected in coolstores.

PTM appears not to develop when temperatures are constantly below 10°C, however some studies found a lower threshold for development ranging between 4.25°C and 13.5°C.

Although there is a wide host range, potato followed by eggplants are the preferred hosts on which the female moths lay their eggs.

“

The need to adopt an Integrated Pest Management (IPM) strategy that involves using all three control options, biological, cultural and chemical control, and not just a reliance on pesticides during crop growth is imperative



Potato Tuber Moth originated in South America and has now been recorded in over 90 countries

The leaf-mining aspect makes them difficult to control with many insecticides. This is in part because of where they feed but also because of insecticide resistance. Biological controls have had mixed success and can be affected by ultraviolet (UV) light or by rain washing them off. Parasitoids (introduced insects) are often affected by the insecticide programmes applied to control the moths and other insects, adding to the complexity of an integrated approach. PTM has shown it develops rapid resistance to control using the virus *granulosis*. Nematodes can be effective but are yet to be commercially produced.

“

Researchers have repeatedly stressed that if cultural controls (in particular soil management and irrigation) are ignored then pesticide applications in the foliar stages of the crop cannot be expected to provide acceptable levels of control

Although current methods of control rely heavily on the use of pesticides, reviews suggest that early control of this pest should focus on cultural methods. Such methods have been known for many years and include **variety selection, deeper planting of seed, producing a large hill, irrigation to prevent soil cracking and early harvest**. Rowe (1993) states in a manual on potato production (in the United States) that “the moths cannot reach tubers covered with more than two inches of soil, unless it is deeply cracked.” Goldson and Emberson (1985) recommended that **in New Zealand deeper planting should be done to help control PTM**. Some of the best-known work on cultural control of PTM was conducted in New Zealand by Marion Foot (1974, 1976). Other cultural controls include elimination of cull piles, controlling volunteer potatoes, and rolling (Rondon 2010).

Researchers have repeatedly stressed that if cultural controls (in particular soil management and irrigation) are ignored then pesticide applications in the foliar stages of the crop cannot be expected to provide acceptable levels of control. This research has been conducted and confirmed in New Zealand as well as in other countries.

The need to adopt an Integrated Pest Management (IPM) strategy that involves using all three control options, biological, cultural and chemical control, and not just a reliance on pesticides during crop growth is imperative. In a recent (2019) article in *Potatoes Australia* magazine, a grower described his experience of using IPM, starting in 1995. His conclusion to the article is the most telling, where he states: “In the last 20 years I have used fewer insecticide applications on all paddocks than I might have used in a single season per crop before IPM.” However, the complexity of integrated control programmes in New Zealand is exacerbated by the need to control Tomato Potato Psyllid as well as the Potato Tuber Moth.

This article is informed by extracted writing from *A literature review for Potatoes New Zealand*, by Dr Paul Horne, IPM Technologies Pty Ltd, July 2020.

The PNZ literature review can be read in full on our website here: <https://potatoesnz.co.nz/research-and-development/technical-bulletins/>

The *Potatoes Australia* article can be found here: <https://ausveg.com.au/app/uploads/publications/PA%20Feb%20Mar%202019%20Web.pdf>

Potatoes New Zealand is contracting Plant & Food Research to screen a Pukekohe population of Potato Tuber Moth for resistance to nine different commonly use insecticides. These will be tested via direct contact with both the moth and the larvae, and indirectly by spraying the potato leaf and introducing the moth and larvae. The results of these tests will be published in October or November. Further populations of PTM will be collected and screened in the coming season in order to detect regional differences in resistance. ●



WHERE DOES SVS FIT WITHIN JOINING THE DOTS?

Words by Andrew Barber, Agrilink, for Vegetables NZ

The Sustainable Vegetable System (SVS) project has a critical role to play in helping deliver the right to farm and the ability to farm.

The ability to farm requires grower confidence that the production system delivers enough product to remain profitable, and therefore maintain jobs and a healthy community.

The right to farm is a far less tangible concept but with potentially significantly greater consequences. The ability to farm may affect production this year, the right to farm may stop production altogether next year.

Both the right and ability must be achieved, otherwise the consequences are the same, crop and business failure.

Joining the Dots is a structured approach to progressing from problem recognition to implemented and audited mitigations. Reporting helps tell the growers' story, building community confidence, and feeds into grower decision support.

The role of SVS in this whole of industry approach is research and dissemination.

Concurrently running alongside SVS is the industry's rollout of Farm Environment Plans (FEPs) through NZGAP (Good Agricultural Practice). FEPs are underpinned by industry developed guidelines and Codes of Practice. SVS dovetails in by improving our understanding of nitrogen leaching and crop uptake. Its research aims are to build a robust model of leaching through the soil. To do this Plant & Food Research (PFR) is collecting detailed measurements of soil physics, nitrogen and water movement. Nitrogen applications are varied to develop performance curves. To build a leaching model, Plant & Food Research also needs to build a crop growth model. To do this they are collecting whole plant nitrogen uptake measurements (alongside the soil measurements).



All models are underpinned by data. Fundamentally SVS collects the data and is then using this data for dual model development. It will be used to inform and improve OverseerFM. Alongside this the data will be used to improve, and consequently increase, grower confidence in the models that sit in behind the recently published document *Nutrient Management for Vegetable Crops in New Zealand*.

How this works in practice for the growers is yet to be decided. Data application sits within the modelling and dissemination workstreams. However, what is obvious is that SVS will build upon previous projects including Rootzone Reality (in which fluxmeters were used to measure and manage nitrogen losses on cropping farms), Future Proofing Vegetable Production (aimed at minimising high nitrate levels in waterways) and the previously mentioned guide to nutrient management. ●



"We have a range of new summer iceberg and green oakleaf hydro lettuce varieties. Ask me about trialing them." Jennifer Sinclair, Technical Sales Representative, Open Field Crops, Enza Zaden New Zealand

ENZA ZADEN



We love pumpkins and lettuce.

Discover our standard varieties like Sampson, Oriola, or new summer iceberg Blas, to maximise your future returns.

Enza Zaden has one of the widest commercial assortments of pumpkin and lettuce varieties in the world. Whichever type you want, we expect to have just the right variety for you. If you want to know the availability of any of our varieties, please call us direct on 099630122. If a favourite variety is suddenly unavailable to you, please call us. We should be able to help you. Our full commercial assortment is available in our seed vault in Pukekohe.

Enza Zaden have supplied New Zealand's awesome growers with many standard commercial lettuce varieties for over 20 years and decades longer for pumpkin. Enza Zaden is a family business that takes the long term view, for the good of growers and consumers. Breeding good varieties takes many years of effort, finding the genetic backgrounds needed, developing predictive tools to make traditional breeding faster, integrating the desired traits, producing great seed, all while looking to the future needs of growers and consumers.

We commit to very long term breeding projects to ensure success in long term partnerships with growers. Our long term investments into the New Zealand market over many years shows our commitment to New Zealand growers. Together with our pumpkin and onion breeding teams based in Pukekohe, we develop innovative solutions and build long term partnerships that support the success of our growing community. Be part of that success, call us direct to request seed of our varieties, contact Beverley Vahai 099630122 or 0211931008 or sales@enzazaden.co.nz for customer support.

For technical advice on open field crops, contact Aneil Hari on 021 367 242, or Jennifer Sinclair on 021 749 471.

For glasshouse crops, contact Louise Millar on 021 711 709. For other enquiries, contact Herman van der Gulik, sales manager: on 021 858 939.

www.enzazaden.co.nz

INTRODUCING ENZA ZADEN PUMPKIN AND SUMMER – AUTUMN LETTUCE

GREY PUMPKIN:

SAMPSON: Vine type, 5-7kg fruit, deep orange flesh colour, flexible, long storage for fresh cut

NELSON: Bush type, super early harvest, smaller fruit (4-6 kg fruit), medium storage

MINARAY: Vine type, 3-5kg fruit, high yields, long storage for individual fruit sale

E30G.00028: New intro, medium fruit size, smooth skin, good taste, long storage for individual fruit sale

SUMMER ICEBERG:

ORIOLA: Summer harvest standard, round large sized head and frame, dark green colour, very uniform quality, good leaf cover

GLENDANA: Summer harvest, medium sized, very uniform and adaptable, tolerates heat, low core, strong against tipburn, large frame

BLAS: New, Summer into autumn harvest, slow bolting and good internal tipburn tolerance, good field standing ability

VICENTOLA: New, transition in and out of summer, medium sized iceberg, good frame, high tolerance to tipburn, best warm to cool season

AUTUMN ICEBERG:

KRAVITZ: New, autumn harvest, faster maturing, medium sized, fast filling, sure heading, good tolerance to pinking

WITIZA: New, autumn harvest, medium to large sized heads, highly uniform, dark green, sure heading smooth leaf

NOLAF: New, autumn to late autumn, medium size, dark green colour, sure heading and fast maturing, adaptable

AUTUMN – WINTER ICEBERG

PEDROLA: Autumn standard, reliable, adaptable, produces medium sized heads with high pack out in changeable weather

BOTIOLA: (Icebreaker) Winter standard, reliable, large size heads, firm heads with good volume, even under adverse conditions

PELAYO: Winter standard for cold conditions, high vigour, large frame, high number of harvestable heads

EAZYLEAF – YEAR ROUND:

WILDBEAST: Standard high yielding mid-dark green incised coral, serrated spikey leaves, fine leaf attachment with crisp texture, pair with Rhone

RHONE: High yielding deep red incised coral type, spikey serrated leaves, fresh green highlights, fine attachment, pair with Wildebeast

BUDGE: Compact green multi cos type, great taste, many leaves of the same size, perfect for salad mix leaf

Buckley: Dark red Italian Oakleaf, upright habit, excellent leaf shape uniformity and high leaf count, flat easy to process leaves, whole head or fresh cut

EZME: Compact red cos rosette, attractive dark red colour, high leaf count with very uniform leaf size, glossy, pairs well with Budgee

GREEN OAKLEAF:

ALVIER: New, mid green fresh shiny oakleaf, with smaller lobes, very uniform, high yield of well filled heads, open field and NFT, year round production



TWO LUCKY ENZA ZADEN ACCOUNT HOLDERS WILL WIN AN AWESOME WEBER FAMILY BBQ!

WINNERS OF THE WEBER FAMILY Q 3200 PREMIUM GAS BBQS WILL BE DRAWN 15 OCT 2020.



WHERE DOES THE RESOURCE CONSENT FIT WITHIN JOINING THE DOTS?

Words by Andrew Barber, Agrilink, for Vegetables NZ

A resource consent to take (such as an irrigation consent), has existed for a long time. So too, though to a lesser extent, has a resource consent to discharge (such as vegetable washwater or greenhouse nutrient discharge).

These consents have typically been for point source takes or discharges, where it is relatively easy to attach a meter and therefore set verifiable resource use limits (or loads in the case of discharges).

The consents that are currently being rolled out around the country now incorporate non-point source discharges of nitrogen, phosphorus, and sediment. *E. coli* is also a major community concern, for which horticulture holds the gold standard.

The problem with consenting non-point source discharges is that they are extremely difficult to measure. Therefore, in most cases these discharges, and the mitigations used to reduce them, need to be modelled.

There are two solutions, and both should be pursued. Firstly, the non-point source discharge needs to be measured. The beauty of this approach is that it tracks actual instead of modelled performance. A recent example is the use of the Teralytic probe to measure nitrogen leaching. The second approach is to record practices.

Irrespective of the approach (measured or modelled), the focus should be on implementing improved practices that reduce environmental load.

“

Farm Environment Plans (FEPs) are a structured system from risk assessment through to the certified implementation of good and best management practices



Farm Environment Plans (FEPs) are a structured system from risk assessment through to the certified implementation of good and best management practices.

The certified FEP becomes the supporting document for a resource consent.

With a plethora of different rules emerging around New Zealand, NZGAP (Good Agricultural Practice) developed the Environmental Management System (EMS) add-on. The EMS sets out in a series of topics, good and best management practices (GMPs and BMPs). These practices were developed by industry, rather than imposed by councils. They are driven through problem recognition by growers, and founded upon industry research and their resulting guidelines and Codes of Practice.

The NZGAP EMS (or FEP) condenses down to the Action Plan, which sets out a timeframe for the implementation of GMPs and BMPs. Consents will be granted based upon an agreed pathway for reducing environmental load. ●



THIRTY-FIVE YEARS AND FOUR GENERATIONS

Farmgard was started by my grandfather, Ben Capper, in 1975 from his basement under his house in Epsom, Auckland. Grandpa had previously worked on a farm, then was a sales rep for IBL – Ivory Brothers Limited. With seven mouths to feed, he decided to start his own business and first sold grader blades, mini scoops, and garden sheds – hence the Farmgard spelling – it was originally called Farm & Garden Equipment.

In the 1980s with import licensing, only two rotary hoes were available in New Zealand – the Gallagher and the Howard. Howard had the license to import, and Gallagher was made locally.

When import licensing was abolished, Grandpa saw the need for another good quality rotary hoe for Pukekohe growers.

With some help from friends in Australia, we got the sole agency for Celli, a small family business in Forli, Italy. Celli had been producing rotary tillers since the mid-1950s, and they were a good family business similar to Farmgard.

Pukekohe was the food bowl for Auckland, and this helped Grandpa get the Celli agency going in New Zealand. Over the next 30 years, Celli become known in the horticulture industry as the best rotary hoe and power harrow available.

Celli has continued to focus on professional horticulture and are continually improving their products and range of equipment.

I remember as a pre-schooler going out with Dad to demo and sell rotary hoes to growers all around the country – Kaitia, Dargaville, Pukekohe, Hastings, Ohakune and many more! He was always training me on the great selling features of Celli and gave me a taste for the incredible industry we are privileged to be a part of, growing food to feed the world.

Now I have a three-year-old boy, who also loves to ride with his dad in the ute to demo and install Celli products around New Zealand!

A few years ago, we decided to broaden our base, and secured the Australian market for Celli. With a number of importers there since the 1970s, Celli were looking for a partner to help them increase their sales of folding rotary tillers, a focus in their business.



The partnership we have with Celli in these two markets has helped them with product development and new models – most recently the Combovator bed former, and the Evo range of professional rotary tillers. The Combovator is a unique bed forming system, with the ability to transform a standard rotary tiller or power harrow into a bed former, without having to extensively modify or engineer a unique machine specific to your bed sizes.



The new EVO range has been developed with the help of growers around the country to include specific modifications to suit our conditions. We have demo machines currently in Pukekohe, Dargaville and Hastings, the three major growing areas for potatoes, onions and kumara.

At Farmgard, we are continually striving to service growers around the country with top quality machinery, towards the key goal of our industry's growers – good quality supply of food.

Our mission at Farmgard is to provide satisfaction through superior knowledge, generations of experience and unparalleled support – 35 years, four generations! ●

Check out our videos on our website
www.farmgard.co.nz



TRIALS SHOW VERY ENCOURAGING RESULTS WITH A NEW GRANULAR NPK BASED ON POTASSIUM NITRATE

Rustica® Hi-K 12-03-20-6S +1.2Mg, 0.01%B, 0.05%Zn, 0.05%Mn

Rosier Borealis is the third largest nitrogen (N) and nitrogen-phosphorus-potassium (NPK) producer in Europe behind Yara and EuroChem Agri (the old BASF factories). Because of their smaller size they have a more flexible production capability and tend to be more innovative as a result. Their new NPK based on potassium nitrate is unique in the world as no other granular NPK producer manufactures it. Rustica Hi-K is an ideal substitute for prilled potassium nitrate which is often in short supply and is typically small and dusty particles which cannot be accurately or evenly spread. It cakes easily and frequently goes hard in the bag. Prilled potassium nitrate also requires dangerous goods storage and safe handling.

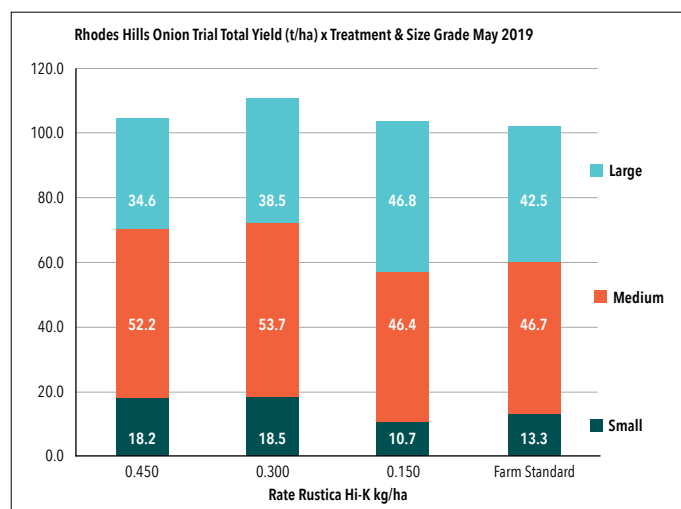
Rustica Hi-K on the other hand is a non-hazardous dust-free granulated complex NPK with 95% 2-5mm particle size which is ideal for an even spreading pattern spread right out to the widest bout widths with high uniformity.

Plant available potassium and nitrate together are easier for plants to absorb and utilise (synergistic). Maximum potassium requirement in vegetables such as carrots, onions and potatoes is very high during the bulking phase of growth. Topdressing with Rustica Hi-K also supplies additional phosphorus, sulphur, magnesium and trace elements. Applying all these nutrients together gives optimal Nutrient Use Efficiency (NUE) and prevents nutrient imbalances in the growing crop. Balanced crop nutrition with high NUE is essential for optimum economic yield response.

In Mid-Canterbury field trials on onions, carrots, and potatoes over the past two seasons, Rustica Hi-K has performed extremely well in the field as both side dressing and as basal applications.

In onions, three rates were applied as side dressings of 150, 300 and 450kg/ha. In every instance positive yield increases were measured, giving the best results at the mid-rate of 300kg/ha.

Even in an onion crop such as this where the yield is over 100 t/ha, the economic response at 2019 prices was over 17 times the cost of the additional fertiliser applied at the 300 kg/ha rate. (Prices for export onions in 2019 were



exceptionally high). However, when using an average grower price of \$300/t the economic response in this case is still six times the cost of the additional fertiliser applied.

Discussion

The results of these field trials are highly significant and this confirms that it is now agronomically and economically feasible for growers to increase the yield and quality of the onion crop by application of the right product, at the right rate and at the right time. This presents onion growers with the opportunity to make well informed decisions for improved onion production.

Whereas it has long been presumed within the local onion industry that additional fertiliser applications can compromise both size (producing excessively large onions) and quality (leading to reduced storability), these trials have clearly shown that this is no longer a safe assumption. The graded samples were in long-term storage and assessed monthly for keeping quality over five months. The keeping quality was excellent

A juicing carrot trial using 750kg/ha Rustica Hi-K at planting produced 146mt/ha paid weight compared to the farm standard programme at 100mt/ha. Not only was the yield difference highly significant, it underscored the crop's sensitivity to chloride used in the standard programme. ●

For more information, please visit our website www.viag.co.nz or call Ian Ferguson 027 836 3727



LEFROY VALLEY APPOINTED AS NUNHEMS NZ DISTRIBUTOR

Lefroy Valley New Zealand has been appointed as the exclusive New Zealand distributor for the Nunhems brand of BASF Vegetable Seeds from 1 September 2020.

Warren Hobson, general manager at Lefroy Valley, says "We see this as a great opportunity to add to our already exciting vegetable seed product range. Nunhems and BASF bring a large range of species to our portfolio including carrot, melon, tomato, cucumber, lettuce and leek."

Nunhems are a global company based in the Netherlands and the driving force behind the BASF vegetable seed portfolio. "They are committed to bringing innovation to all customers from growers to consumers, a long-standing company with a world of knowledge and years of experience," Warren says.

In recognition of the expansion of the company's portfolio, Lefroy Valley has appointed Paula O'Hanlon to the role of technical sales representative. Paula has over 30 years' experience working in horticulture. During the last 12 years she was a technical advisor for RSF Ltd (Roots, Shoots and Fruits Ltd). In that role she enjoyed working with her valued customers to encourage a holistic approach to growing.

In late 2016 Paula took on the role of sales specialist with Nunhems (now part of BASF Vegetable Seeds). Paula covered all the Nunhems portfolio throughout New Zealand and quickly established herself as a solutions provider, working with growers to find varieties that suited their requirements and locations.



While Paula will have a focus on Nunhems lines, and in particular tomato and cucumber, added to this will be the existing Lefroy Valley product range. This does mean that Paula will be travelling less and sharing the workload and grower visits with the other regional sales representatives. ●

Grower queries please contact Paula on mobile **021 731 009** or email paulao@leeroyvalley.co.nz. Please join us in welcoming Paula to our Lefroy Valley team.

“

"I have greatly enjoyed growing my knowledge and expertise on a wide range of vegetable crops and am looking forward to this new challenge," Paula says.



Call us today about our full seed range

0800 Lefroy (533 769)



A SIMPLE ALTERNATIVE TO COLD STORAGE FEES

In times like these, we're all thinking about ways to make our business more secure and looking for ways to cut costs.

Creating a coolstore on your property might be simpler than you thought. NZ Foam has managed new coolstore builds for growers, and also created coolstores from existing buildings.

"Instead of a costly off-site storage facility, you pay the capital costs once and then that building can be useful all year round," says NZ Foam's Chris Haughey.

Chris has a building background and so he understands exactly what it takes to turn a shed into a coolstore – or build one from scratch.

"The key is to do it well, or it doesn't add up. If your coolstore isn't protected from the rapidly fluctuating temperatures that we have in a lot of the country, then you'll spend too much on cooling costs."

This is where spray foam comes in. NZ Foam uses closed cell spray foam insulation to deliver the best thermal performance on the market. Spray foam fills the gaps of older buildings to create an air seal that keeps cold in. It doesn't absorb moisture so it's the perfect choice to keep your produce dry and fresh all year.



Spray foam will actually increase the structural stability of your old shed or farm building – and it performs for the life of the building.

NZ Foam can get involved from the initial design and can organise any building requirements as well as the refrigeration contractors.

"Every property is unique. We work together to understand what you want the end result to be, and then we make it happen," Chris says.

NZ Foam converted a chicken shed into a red onion store that holds up to 12,000kg for Roper & Sons Ltd, who provide the market with 800 tonnes of red onions each year.

NZ Foam sprayed the interior concrete walls and the tin roof with 80mm of permanent, inert, airtight rigid closed cell polyurethane spray foam. Air conditioning provided the cooling system and created two spaces, with separate digital-controlled temperature, for storing other produce like pumpkins that need a warmer environment.

NZ Foam is a Kiwi owned company that's proud to be the leading provider of New Zealand's best insulation product. Spray foam insulation is safe, environmentally friendly and dust and fibre free.

Most importantly for coolstore conversions, it's thermally superior – so you can trust your lovingly grown produce will stay fresh on site until it heads off to the market and the tables of families everywhere. ●

To learn more, head to insulation.nzfoam.co.nz/grower



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We create chemistry