The RCHARDIST[®]

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HORTICULTURE NEW ZEALAND

Transforming fruit through technology

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Change can be hard

I have empathy for the farmers and growers who "howled" in protests up and down the country in August.

By Barry O'Neil : HortNZ president

These farmers and growers are organising to protest again in November, bringing public attention to the very real challenges the rural sector faces around climate change, freshwater, land use and the shortage of labour. It is easy to understand that to most, it all seems too much and too soon.

Some protestors have called for a blanket stop on all the reforms, but I would prefer to hear discussion and debate about what would be better approaches than what is proposed. I would like to think that most would agree that climate change requires us to rethink how we grow and farm, or restore river water quality, for example; and that the Resource Management Act (RMA)

requires reform as the current one is not working. I do not at all believe the New Zealand public is blaming farmers and growers for what the whole country needs to address. It is more a case that there is greater awareness than ever before of what is happening to the environment and the responsibility we all have to act.

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I would like to think that most would agree that climate change requires us to rethink how we grow and farm, or restore river water quality

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

So, what do our consumers want us to do?

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

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

will hopefully help them understand why we are asking them to pay a fair price for our produce.

One thing that is clear to me is the increasing consumer demand for healthy, great tasting food, produced in a more sustainable way – which will return our rivers to a healthier state and manage the impacts of climate change for future generations. Consumers are also seeking assurances that our sector is operating with good social practice.

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

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

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



When I think about this government's understanding of horticulture, I think about the policy changes being made to support vegetable growing especially in Pukekohe and the Horowhenua. The Recognised Seasonal Employer (RSE) scheme for example, allowing workers from the Pacific to work in New Zealand without the need for Managed Isolation & Quarantine (MIQ), and the Climate Change Commission's report actively promoting horticulture as a more sustainable farming solution. In other words, I see a government that is wanting to support horticulture, within the policy settings it is rolling out.



I see a government that is wanting to support horticulture, within the policy settings it is rolling out

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

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

Kia kaha.



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Growing out of adversity

Like a lot of people, I am finding it hard to believe it is November already.

By Nadine Tunley : HortNZ chief executive

Since August, New Zealand has been grappling with lockdowns and alert levels, as the government has moved from an elimination strategy to a management one because of the highly infectious nature of the Delta Covid-19 variant.

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

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

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

going from lockdown to lockdown, even with government support.

What businesses need now is clarity so that they have confidence to make decisions that will affect the



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THE CHIEF EXECUTIVE



New Zealand economy for the next 10 years. While current economic indicators are positive, we only need to look overseas at Britain to see what might happen if we do not make moves now to manage what we can control, with decisive leadership and planning.

Staying the distance

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



Demand for fresh, healthy fruit and vegetables has never been higher

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

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

While there will be many challenges moving forward, our industry remains strong and determined to succeed

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

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

YOUR LEVY AT WORK

INDUSTRY WIDE ISSUES FOR INDUSTRY GOOD

Natural resources and environment

By Michelle Sands : HortNZ environment manager

Northland Agrichemical Decision

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

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

The decision of the Court, in summary:

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

HortNZ will be communicating on the new requirements with growers.

Outstanding Water Bodies mediation

Hawke's Bay Regional Council Plan Change 7: *Outstanding Water Bodies*, proposes to change the Regional Resource

Management Plan (RRMP) to include a list of the region's outstanding water bodies, together with a framework which prescribes a high level of protection for these water bodies in future plan making.

The water bodies identified in the Proposed Plan Change 7 are the 'best of the best' within the region, featuring an exceptional cultural, spiritual, recreational, natural character, landscape, geological, or ecological value which is remarkable in Hawke's Bay.

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The water bodies identified in the Proposed Plan Change 7 are the 'best of the best' within the region

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

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



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YOUR LEVY AT WORK

Overseer Review

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

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

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Overseer has been a fundamental tool underpinning the planning regimes in a number of regions

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

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

Emissions Reduction Plan

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

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

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



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On-farm biosecurity series: Vehicles and Machinery

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



By Anna Rathé : HortNZ biosecurity manager

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

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

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

Vehicles and machinery have many nooks and crannies where plant debris or soil may be lodged. It is important to make sure that all vehicles and machinery that visit your property are clean to minimise any biosecurity risk

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Entry of Vehicles and Machinery

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

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Vehicle and Machinery Hygiene Practices

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

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

🗸 Vehicle accessible

🗸 Away from crops, paddocks and waterways

Equipped with a high-pressure hose and bins for disposal of any cleaning gear

- Situated on a non-porous material (e.g., a concrete pad) with wastewater channelled away from crops and waterways, or preferably collected in a sump
- Regularly checked for new pests, diseases or weeds, especially areas around the wash down facility and next to access roads and tracks.

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

In conclusion

>

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

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

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



Ideally, vehicles and machinery should be cleaned from the top down and taken apart where possible



Machinery and equipment being cleaned in a washdown area before entering and exiting a kiwifruit orchard

Buying or moving machinery to a kiwifruit orchard?

By Lisa Gibbison : Kiwifruit Vine Health

Kiwifruit Vine Health (KVH) manages biosecurity risk on behalf of New Zealand's kiwifruit industry. For many years now we have successfully prevented the bacteria Psa entering the South Island, by all working together to ensure the rules in place around moving risk items are known and understood.

There are strict requirements supported by the Biosecurity Act, that prohibit kiwifruit plants, budwood or pollen being moved from any North Island location to the South Island. There are also rules for the movement of machinery.

Second-hand tractors or sprayers often have kiwifruit leaves lodged behind fans, radiators, in wheel arches or in difficult to access areas such as behind a battery box. Any damp, fresh leaves could easily carry Psa to a South Island kiwifruit orchard and Psa can travel for up to 10kms on a windy day.

KVH asks all growers to be mindful of these biosecurity requirements and speak with us if there are any questions or concerns. More information is available on the KVH website at www.kvh.org.nz or by contacting KVH on 0800 665 825.

YOUR LEVY AT WORK



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

Joy found in successful delivery of research

Enabling and empowering great science is Miriam Hall's day job and it's one she absolutely loves.

By Elaine Fisher

With a Master of Science in plant physiology and a Master of Business Administration, Miriam has found the ideal role for her talents and interests as a business manager with Plant & Food Research Ltd.

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

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

"It's a really diverse job and I love that I get to work with science and scientists on projects initiated from talking with customers," she says. Seeing growers apply the results of scientific research that make positive differences to their businesses is an aspect of Miriam's job that she says she really enjoys.

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



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



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

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

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

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

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

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

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

Miriam has also trained as a facilitator and designs and runs workshops internally for Plant & Food Research and externally as well. This combined with her management role, means in pre-Covid lockdown times she travelled frequently throughout New Zealand and offshore to meet customers and science teams and to run meetings and workshops. Miriam has a strong interest in the legal side of commercial horticulture and this is something she wishes to grow her skills in and study further.

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

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

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

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

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

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





Melissa van den Heuvel wins

'Avocados have my heart,' says 2021 Young Grower of the Year

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

By Andrew Bristol

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

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

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

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

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

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

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



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Finalists

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

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

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

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

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

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





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

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

ACROSS THE SECTOR — ACROSS THE COUNTRY





Making a buzz in horticulture

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

By Helena O'Neill

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

The project has three main objectives:

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

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

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

crops like avocado, kiwifruit and passionfruit.

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





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

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

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

66

In the field, the queen of a commercial bumblebee hive lives for approximately 10 weeks, then the hive winds down once the queen dies

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

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

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

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

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

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

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

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

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

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

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



Mating bumblebees at Zonda Beneficials at Waiuku

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

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

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

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



Hives are normally replaced by growers every three to four weeks

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

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



Industry connection a highlight for scholarship recipient

By Emma Boase : HortNZ people capability manager

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

Reuben is the 2021 recipient of the Horticulture New Zealand Postgraduate Scholarship, receiving \$10,000 and professional development opportunities.

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

"There's a wealth of opportunity including options to travel and lots of exciting problems to explore," says Reuben. "There's something meaningful about being able to contribute to a core part of the New Zealand story sustainable food and fibre production."

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

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

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

"It's the first time I've managed a large project so I've learned a lot about planning and project management. I also work as part of a team and so I'm gaining more appreciation for the benefits of everyone contributing.



I've gained a lot of technical skills but perhaps most importantly, I've gained skills in communication. Science communication, both written and verbal, and the ability of scientists to communicate their research is vital."

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

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

Reuben has five tips for those considering postgraduate study:

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

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Dr Matt Glenn is the inaugural chief executive of the new Kiwifruit Breeding Centre, based in Te Puke

High expectations for new Kiwifruit Breeding Centre

Producing new, sustainably grown kiwifruit varieties which delight consumers with their taste, health attributes and appearance and can withstand the rigours of the supply chain, are among the aims of the Kiwifruit Breeding Centre, launched in October.

By Elaine Fisher

The new 50/50 venture, established and jointly funded by Plant & Food Research and Zespri, is based in Te Puke, and operates out of Kerikeri, Motueka and Mt Albert in Auckland. It will also have a presence offshore in selected kiwifruit growing regions. Each organisation will share royalties from any commercialised new varieties produced in the future.

Inaugural chief executive of the new Centre, Dr Matt Glenn, says the facility will be the key to the future success of New Zealand's iconic kiwifruit industry.

"Plant & Food Research and Zespri have laid a very strong foundation," Matt says. "They now want us to spread

our wings and develop new cultivars that will delight consumers all around the world."

The centre aims to extend New Zealand's position as a world-leading innovator in kiwifruit and Matt says it

has the resources in its talented staff, facilities and plant genetics, to do so.

"We have inherited some fantastic scientists with decades of experience who understand our heritage and what we want to do," says Matt. "We also have a very diverse pipeline of kiwifruit varieties, with some excellent parents

from which to continue to breed new cultivars. I am very excited about the future and the focus to bring new products to markets as soon as possible."

Kiwifruit currently occupy a very small percentage of the international fruit basket and are generally seen as 'cut and scoop' fruit rather than being peeled like a banana, or eaten skin-and-all like apples. "This offers a great opportunity for New Zealand to grow its share of that basket by introducing exciting new varieties," Matt says.

Those new varieties will have to meet a raft of stringent criteria to win a place in the fruit bowls of consumers. Criteria will include being nutritious, looking and tasting great and being grown sustainably.

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All those attributes will be achieved using traditional breeding, not genetically modified techniques

The breeding programme must also focus on producing new cultivars that help growers achieve better yields while using less on-orchard inputs. In a future where fruit may be picked by robots, Matt says consideration must also be given to different growing and vine training techniques.

"Labour is a huge issue for the entire horticulture industry and robotics provides an opportunity to help address that. In the Hawke's Bay, many apple orchards no longer grow three-dimensional trees. They are two-dimensional. That's not for humans to harvest the fruit. It's for a future where robots are used."

The third area the Kiwifruit Breeding Centre (KBC) must consider is the supply chain.

"There is no point in producing a beautiful looking and tasting kiwifruit if it doesn't perform well in the supply chain," Matt says.

All those attributes will be achieved using traditional breeding, not genetically modified techniques.

"However, there are genetic techniques, separate to the breeding programme, which can help identify traits of interest in the plants, so breeders can select those desirable traits early, all of which speed up the breeding process."

Matt says even with the use of these technologies, it can take "tens of years and tens of millions of dollars to develop just one ideal cultivar."

The KBC will have a staff of 45 to 60. Most have transferred from Plant & Food Research, but some are new appointments. Collaboration will be a big focus. It will be vital that those with pan-sector expertise have input into the programme in order to produce new varieties which meet all of the grower's requirements, the post-harvest sector's requirements and those of the modern consumer, Matt says.



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The New Zealand kiwifruit industry and Plant & Food Research have a 30-year relationship of breeding new varieties, including the highly successful G3 gold fruit, marketed as Zespri SunGold, which helped the industry recover from the impacts of the Psa-V vine disease.

As well as seriously impacting commercial orchards, the disease also affected vines in the Plant & Food Research orchard in Te Puke where the new Kiwifruit Breeding Centre is based and where the Psa-V tolerant G3 variety was bred.

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New varieties will have to meet a raft of stringent criteria to win a place in the fruit bowls of consumers

Matts says thanks to the breeding programme already in place, the industry did not have to wait ten years to find a replacement for the previous gold variety, Hort16A, which could not withstand infection by Psa-V.

Kiwifruit Breeding Centre chairman, Michael Ahie, is an experienced agri-food and innovation sector director who is Chancellor of Massey University and a former chair of Plant & Food Research.

He says Matt's appointment to the chief executive position of KBC followed an extensive recruitment search.

"The board is pleased to secure a candidate with such strong leadership qualities and experience," Michael says. "Dr Glenn really impressed the board not only with his experience but also his vision for how the Kiwifruit Breeding Centre can lead the world in kiwifruit breeding.

"We know Dr Glenn also brings strong leadership from the roles he has held previously, which include executive and leadership roles at Hill Laboratories, Robotics Plus and Quayside Holdings - the commercial investment arm of the Bay of Plenty Regional Council.

"Based in the Bay of Plenty, Dr Glenn's strong background in science, technology and business management will support the Kiwifruit Breeding Centre as it accelerates Zespri and Plant & Food Research's world-leading new cultivar development programme."

The Kiwifruit Breeding Centre's logo contains a hint of what may be to come from that programme. Of the eight kiwifruit 'seeds' it depicts, one is red, one is gold and one is green, representing the colours of the current varieties. The remaining five are black.



When asked what they represent, Matt replies with a smile, "wait and see." •



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Workplace Assessors: Making a real difference to training and development

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Training someone while they are working can sometimes be tricky to juggle for a business, and that is why a workplace assessor is such a key part of success. They oversee the formal marking process and provide mentoring, either within their own workplace or independently. They are a vital part of maintaining the quality of Primary Industry Training Organisation (ITO) qualifications and programmes.

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

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

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

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

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

In addition to being registered as workplace assessors with the Primary ITO, assessors are expected to have a minimum level of professional training (Unit Standard 4098 for workplace and affiliate assessors). The Primary



Heather Feetham, 2021 Pukekohe Young Grower of the Year winner

ITO Quality team also regularly review the workplace assessors' professional practice, and assessors are expected to participate in ongoing continuing professional development workshops offered by Primary ITO.

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

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

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

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

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



How does assessment work alongside trainees?

1 Assessment and learning are linked.

When assessment happens during learning, it is usually informal such as when a supervisor gives a trainee feedback on how they are getting on with a particular aspect of their work. There are other forms of assessment that occur on the job which are explained in detail when someone registers to become an assessor with Primary ITO.

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

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

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

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

What does it take to be an assessor?

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

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

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

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Lucia Romero is investigating the development of avocado diseases and their management alongside the NZ Avocado industry

Protecting the avocado industry through research

Lucia Ramos Romero grew up in Granada, Spain – a province known for avocado production; and later spent time in Germany, researching cereal and vegetable crops.

By Emma Smith : Plant & Food Research Ltd

Lucia is now a scientist in the Epidemiology and Disease Management team at Plant & Food Research, investigating the development of avocado diseases and their management. She works alongside the New Zealand avocado industry to implement best practices in orchards and to support export growth.

"I feel fortunate that my new home since 2017, New Zealand, is giving me the opportunity to reconnect with this fascinating fruit crop," Lucia says. Hass is the main avocado variety grown in New Zealand. It is a subtropical fruit grown in a temperate climate, which can bring challenges such as fruit rot diseases, which occur in many avocado-producing regions worldwide and can negatively affect quality and consumer satisfaction.

"The fungi infect the fruit in the orchard, but symptoms normally appear once the fruit is collected and starts to ripen. This can make the management of rot diseases extremely challenging," says Lucia. Lucia is working with the avocado industry to analyse and identify underlying cultural, chemical and biological practices already happening in the orchard that may contribute to low incidence of diseases. She investigates the extent to which these practices influence avocado production.

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Dense canopies with dead wood, leaves or fruit enhance the growth of fungi that cause diseases ... These fungi also survive from season to season in dead fruit or other plant material on the ground, so orchard hygiene is important

"Dense canopies with dead wood, leaves or fruit enhance the growth of fungi that cause diseases," says Lucia. "These fungi also survive from season to season in dead fruit or other plant material on the ground, so orchard hygiene is important. Copper sprays can also be used to help to keep diseases at a low level."



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Lucia is very thankful to the NZ Avocado representatives and growers for their cooperation and willingness to provide access to their orchards for research.

"Working closely with the avocado industry is key to understanding their needs and focusing on the real problems we need to solve. At the end of the day, the work we do is to support their success and the success of New Zealand."

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Working closely with the avocado industry is key to understanding their needs and focusing on the real problems we need to solve

Lab work is another important aspect of her investigation into avocado diseases, as it may provide further insight into the occurrence and development of pathogens that infect avocado crops. Lucia is currently investigating ways to isolate disease-causing pathogens from the plant material they infect, such as avocado fruit and stems. This will allow her to identify what pathogens are present, as well as characteristics such as when and how those pathogens infect and what weather conditions encourage them to thrive. "By increasing our knowledge of these factors, we can give growers a more accurate timeframe of when to intervene. If we can detect a period that favours the spread and development of certain pathogens, for example, growers could be advised to focus their sprays or hygiene practices during these key periods, reducing unnecessary spray applications and workload during the year," says Lucia.



Avocado growers are regularly informed of new findings from this research through orchard visits, workshops, the NZ Avocado website and Avoscene journal.



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Manager recognised for helping young people succeed

By Victoria Harris : Summerfruit NZ

Tim Hope sees great value in developing young people in the horticulture industry. This is what led him to win the Mack Nicol Award for Commitment to Excellence at this year's Summerfruit NZ conference.

Operations manager at CentralPac in Cromwell – a cherry orchard growing premium fruit for export – Tim oversees up to 350 staff at peak season and thrives off the daily challenges of the job.

"Cherries are a tough game, but you stick at it," Tim says. "It's about the people and they are all good people I work with."

He said winning the award came as a bit of a surprise.

"I prefer to stay under the radar. My success comes from how well others do, rather than how I do."

But admittedly, he said it was nice to have recognition of all his hard work and like anyone who chooses horticulture as a career, they understand the huge commitment involved.

"You're up in the middle of the night, it affects your free time, and for us, the best time of the year is when everyone else is at the lake."

The judges said Tim was selected for the award after not only showing huge dedication in pursuit of excellence, but also his superb people and communication skills.

"If the award was just based on how well you did your job, you could get pretty depressed," Tim joked. "The cherries get rained on, they split..."

Born in Taranaki and originally an equestrian trainer, Tim believes it was his relationships with horses that helped him understand people. His sensitivity and reading people's body language are very similar abilities to those developed working with horses.

"I feel like I know how people are feeling before they even say anything."



CentralPac Cromwell operations manager, Tim Hope, with his Mack Nicol Award for Commitment to Excellence

This is important as a leader in the industry, particularly when dealing with young staff and how they manage themselves in a work environment.

Tim was selected for the award after not only showing huge dedication in pursuit of excellence, but also his superb people and communication skills

The move from horse training to horticulture came after living in Christchurch and needing extra money. He tried his hand at picking apples and from there, was offered a full-time job.

A supervisor position then came up in Alexandra. Arriving in the middle of winter, he recalls he wasn't all that impressed with the climate. "

"It was freezing and the temperature never rose above 3 degrees Celsius."

Tim took the punt anyway and reaped the benefits. He is now also a Primary ITO accessor - a role he loves as he gets to see young people succeed.

In horticulture there is never any guarantee of success, but Tim understands exactly how to roll with the punches – particularly after two lockdowns.

"Nature drives the work plan so you have to go along with it." ${lackbdash}$

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Bruce Fraser in his Riwaka orchard

Sweet and unique: PiqaBoo reaches record highs

The 2021 season produced plenty for Piqa®Boo® growers to think about, with record prices and an insatiable demand for their fruit, balanced against continued production difficulties.

By Rose Mannering

Prices reached extraordinary heights, with the highest recorded being an 18 kg carton of count size 70 fruit selling for \$182.

Freshmax Asia sales manager Greg Sutherland says after five years marketing PiqaBoo, the demand and excitement continues to grow as more markets and consumers are exposed to the crunchy European-Asian pear hybrid bred at Plant & Food Research Ltd.

"In 2017, we sold 1,400 trays and despite tough growing issues this past season, we reached 8,600 trays," Greg says. "All customers want more; we could comfortably sell three or four times the volume."

Prices reached record levels and were 26% higher than

last season, despite the exchange rate moving considerably and in the wrong direction.

"These were also transacted at a 0.70 cent exchange rate (NZ to \$US). In the 2020 season we were in the low 0.60 cent range," says Greg.

Marketers of PiqaBoo were aware they needed to increase the prices paid to growers who faced a suite of unfavourable conditions including poor

exchange rates, and sharp increases in shipping and labour costs.

"We were expecting some push back from consumers, but such is the demand for this unique and tasty fruit that we were still not able to supply enough to meet the continued strong demand.



The European-Asian pear hybrid PiqaBoo has a sweet, fresh flavour and a crisp, juicy texture similar to a Nashi pear

"This season our PiqaBoo was sold in China, Malaysia, Singapore, Taiwan and the United States. We could have shipped to many more markets if we had more supply," Greg says.

Malaysia is normally a value market with strong competition from South African pears, however demand for PiqaBoo was so strong there was even a request for air freight shipments, which adds another USD1.50 / kg to the price. "We believe there is a very exciting future for this new and unique fruit and believe we will continue to undersupply the ever-increasing demand for many years to come."

For Nelson grower Bruce Fraser, attention to all the details is needed to ensure a top crop. Early thinning to ensure a good fruit size and ample water are essential. He is a great fan of PiqaBoo.

"This is a winning pear, and it has been incredibly good for us," Bruce says. His orchard received an average payout of \$160 a TCE (tray carton equivalent) this year.

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We believe there is a very exciting future for this new and unique fruit ... we will continue to undersupply the ever-increasing demand

One block was affected by bud die-back and considerable research is going into finding the cause of this. Bruce grafted his existing Comice pears on an older style Ebroespalier trellis. This year's blossom is looking strong and Bruce is hopeful of a good outcome.

"The old saying money doesn't grow on trees, I have been getting three cartons per tree in some blocks, so it just about does," he says.

Producing a good crop is demanding and requires a lot of work, but this year's crop is all pre-sold. With the extra cost of freight expected for the coming season, Bruce is relieved to be producing a high-value crop. The Riwaka grower has all his crop under hail netting and is sitting tight for a good harvest this year.

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/e could have about does," he says. nore supply," Producing a good cro of work, but this year's



Field-day at Stuart Kilmister's Opus Orchard



A strong blossom on Bruce's Ebro growing system is promising for the coming season

However, Hawke's Bay grower Stuart Kilmister, Omarunui Road, adds a caution to the record prices. His PiqaBoo trees planted in 2016 using the intensive Future Orchard Planting Systems (FOPS) have so far produced no more than 20 tonnes a hectare. Stuart's canopies are still young and developing. By comparison, apples planted at the same time are now producing 75 to 80 tonnes a hectare.

"It is a great product, but we growers face a few challenges," he says.

The delicately flavoured crunchy pear suffered greatly in Hawke's Bay with fire blight last year, despite every precaution being taken.

"I had a massive burn pile," Stuart says. "If it is not managed right, I could lose trees within the orchard." Bud die-back was also problematic in Nelson last year.

"If we manage to crack the code and work with scientists to get the production levels up; we are still learning to grow them," he says. Timing of suitable pollinators is another area where greater focus is needed.

"We believe we can get 50 tonnes a hectare on mature orchards, to produce a sustainable crop. The marketer's job is easy," he says.

The odd shape of the fruit has presented another challenge as it will not go through the packhouse's optical sorters.

At a field-day at Stuart's property in October, it was revealed that the Plant & Food Research blocks of PiqaBoo pears were producing up to 45 tonnes a hectare. AgFirst monitoring indicated commercial blocks could produce more than 40 tonnes. The most ideal growing system is still under debate, with different growers using 2D systems, FOPS and double and central leader.



Kurt Livingston of Fern Ridge Fresh says the value of the unique fruit is starting to be fully realised

Kurt Livingston of Fern Ridge Fresh says the value of the unique fruit is starting to be fully realised. Quality issues marred the 2020 season, with fruit of mixed maturity and poor coolchain management leading to problems at outturn. Tight adherence to grade standards has led to much better outcomes in 2021.

"We are very excited for the coming year," says Kurt. "We are starting to reap rewards from our hard work." A strong local market is also developing.

Genesis Nurseries national sales manager Mike van Workum says demand for trees is high, particularly for trees on dwarfing stocks Quince C and BA29. A lead time of a few years will be required to produce new trees. "It is exciting to see growth for such a unique fruit," Mike says.

Commercial plantings are underway in Gisborne and Timaru for the first time. There are close to 140,000 trees in the ground already. ●



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Layers of fruit spend up to 20 hours in the dryer

Little company makes big strides in fruit technology

Smart technology developed in Nelson is giving high-value fruit snack company, Little Beauties, the ability to double its production and more than halve staff requirements.

By Anne Hardie

'Mechatronics' describes the technology that uses smart sensors and an element of robotics to peel, slice and spread gold kiwifruit onto trays to be loaded into purpose-built air dryers. This year it will be used to process up to 130 tonnes of gold kiwifruit sourced mostly from Nelson growers. The organic fruit is brought in from the Waikato.

Kiwifruit is one of just five fruit included in the company's range of snacks. Boysenberries, raspberries and feijoas are sourced locally and the blueberries and additional feijoas come from the North Island.

It has been a journey of exponential growth for the company which began on the Wastney family's small feijoa orchard a decade ago. Ian Wastney started out using a home dehydrator to send feijoa overseas to family members and the concept for the business grew from there. Numerous family members established the groundwork in a small food manufacturing facility on an orchard near Richmond and now Little Beauties includes investors who have provided the capital to ramp up production and expertise.

Third grade gold kiwifruit that would otherwise be stock food makes up a big chunk of the business. Until now, it has been a tricky fruit to peel and slice.

Chief executive and investor Rob Simcic says the company realised it needed smart technology to scale up and to do that, it needed investors to come on board. It has raised

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Chief executive Rob Simcic

\$4 million, including \$2.5 million this year through its networks which he says added not just capital, but also ideas and expertise.

Nelson Regional Development Agency helped secure funding from Callaghan Innovation to research and develop the processing technology for kiwifruit. Future Food Systems in Nelson usually works with meat and dairy, but using its mechatronics expertise, came up with a purpose-built peeler and slicer for kiwifruit. This innovative equipment thinly slices the fruit and lays out the pieces on trays to be placed into an air dryer. The kiwifruit are almost paper thin when they are removed up to 20 hours later. One hundred kilograms of fruit that would otherwise be wasted is transformed into 10kg of premium dried kiwifruit product at the end of the drying process.

The new technology to prepare the fruit is now in place, but will need to be fine-tuned to handle the natural variation of kiwifruit. Robotic arms, which are yet to be installed, will automate the process even further.

While the technology will increase the company's output, Rob says it will also reduce labour input. Once completed, the process should reduce the number of full-time employees they would have otherwise needed, by more than 50%. Existing staff will be allocated to areas where staffing needs have increased due to higher production, such as dispatch. About 20 staff are employed on a permanent or casual basis.

Alongside kiwifruit, Little Beauties freeze dried around 30 tonnes of feijoas this year and 30 tonnes of berries, including boysenberries, raspberries and blueberries.



The blueberries have proven popular with kids as the freeze drying gives them a crunchy texture that appeals. Rob says they are planning to double the quantities for all those fruits next season. The boysenberries and raspberries are sourced from local growers - the raspberries being a new cultivar called Wakefield - while blueberries come from the Miro collective of Māori food producers.

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One hundred kilograms of fruit that would otherwise be wasted is transformed into 10kg of premium dried kiwifruit product at the end of the drying process

While berries and feijoas can all be frozen to use throughout the year, kiwifruit has a limited life in coolstores. The new technology will process kiwifruit from June through to October before the fruit softens too much for the peeling and slicing process to work well.

Air drying technology is used on site at the company's Richmond premises, while freeze drying is done on contract. Rob says the Nelson-Tasman region is a good base for what he calls 'co-opertition' – a cluster of food and beverage-producing businesses that work collaboratively without being direct competition to each other. Back in Little Beauties' own factory, the kiwifruit slices are packaged simply as air-dried slices, or dipped in Trade Aid's 55% dark chocolate that's manufactured in Christchurch. The organic kiwifruit slices are dipped in 70% dark chocolate and a portion of the freeze-dried boysenberries they produce are dunked in white chocolate.

"The whole presentation is at the right end of the spectrum for New Zealand produce; it speaks of high quality and is very New Zealand," says Rob.

Much of the fruit, such as feijoas and berries, are hard for their respective industries to export in significant volumes due to their limited shelf life. Through their dried range of products, Little Beauties hopes it can showcase some of New Zealand's premium fruit to the world.

The whole presentation is at the right end of the spectrum for New Zealand produce; it speaks of high quality and is very New Zealand

Rob says Little Beauties is a strong brand that could get some good milage globally and the products are well suited to the digital market because they have the appeal of being plant-based, are New Zealand owned and produced and are functional foods. Plus, the products have unique flavour, high food value and are light to pack making them easy to send around the world.

Gold kiwifruit

being harvested

by the Thomas

Brothers Orchard

for Little Beauties

Some product is exported directly to the United States, Japan and Australia. Kiwis in Australia make up a good chunk of their market for feijoa slices because it is a fruit that reminds them of home. But Rob says the greatest potential lies online.

This year the company launched a website in the United States and updated its online New Zealand store to sell products globally. It will soon launch its products on Amazon as well as SnackMagic and will have product going out via the Cloud Retail service in California which delivers direct to the customer's door.

"The world is moving so fast," Rob says. "The traditional distribution models are changing and Covid has sped that up."

The company has just been through its third website build to make it "delightful and easy" for customers to view and buy - a real sign of the times the company is operating in. Getting the technology systems talking to each other is part of today's online environment which Rob says is a key enabler to scalability. It also provides critical data for the company on its customer and potential customer base.

> "You can see where people are coming from, what they are interested in, where you are losing them and can use that data to make improvements."

New Zealand Trade and Enterprise has been offering Kiwi businesses a review of their digital offerings and Rob says that has been helpful for making changes. Customers around the world are shopping digitally and he says they need to be agile to keep pace.

"We want to be right at the pointy end of that and offering a world-leading experience."

There is potential to expand the business into other horticulture crops down the track, particularly those iconic New Zealand fruits, but for now the company will be focusing on establishing sound markets with its existing products.

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Weird and wonderful produce box reducing food waste

By Glenys Christian

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

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

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

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

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

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

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

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

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

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



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

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

Growing their business to 200 subscribers has extended their delivery area outside of Taupō's 30,000 population base to Turangi and other settlements around Lake Taupō. Customers can opt for weekly, fortnightly or three-weekly deliveries of 'mini' or 'massive' fruit and vegetable boxes.

66 Nine times out of ten, it is fresher because it hasn't been in a coolstore

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

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

Jen says the relationships they have developed with growers have been "amazing". About 16 growers have supplied the operation with produce at least twice. A Katikati avocado grower brought them reject fruit last year rather than sending it away to be processed for oil. With a price drop in this year's avocado crop, it means they are supplying fruit that would otherwise have been exported.



A Katikati mandarin grower is one of Misfit Garden's suppliers

Two Ohakune growers supplied carrots and Brussels sprouts this winter and a Hawke's Bay small-scale grower keeps Misfit Garden in mind when they have a silverbeet crop that bolts or is affected by heavy rain, making it unsuitable to be sold to the major supermarket chains due to cosmetic imperfections.

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

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

"The weirder the better."

Misfit Garden will look for more suppliers as the business expands in order to provide customers with the option to customise their produce boxes - swapping out particular items so they get what they most enjoy. They won't be landed with an aubergine or Jerusalem artichoke if they particularly dislike them, for example. But Jen says including the unusual often generates a great result with parents who send in photos of their kids excited when the box arrives and eager to find out what it contains.

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

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

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

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

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





Tātau Tātau Horticulture general manager, Clare Easton (left), with TTH and Ngati Pāhauwera Commercial development chair, Tom Keefe and Ohuia Incorporation chair, Rangi Manual (right)

Wairoa trial orchard paves the way for local iwi

A global pandemic, multiple lockdowns and some very wet Wairoa weather have failed to thwart ambitions to use horticulture as a vehicle for better land use and better lives for whānau.

By Kristine Walsh

Tātau Tātau Horticulture (TTH) welcomed 12 new cadets to its fledgling horticulture scheme, signalling the start of both their employment and the launch of an exciting new planting programme.

The pōwhiri at Kihutu Marae, Wairoa, was a joyous occasion.

TTH general manager Clare Easton says getting the planting programme up and running has certainly been a challenge, particularly given the country plunged into yet another Level 4 lockdown the day after it launched. She says the group are determined to get to a place where local iwi, and Wairoa in general, get to benefit from initiatives that make better use of land; provide meaningful long-term employment; and boost the local economy. "I started this job in February and like the rest of the horticultural industry, we have had a lot to overcome," Clare says.

In the second week of October, those new cadets, along with a small army of extra hands, planted out the first development of Envy apples and a small trial of Piqa Boo pears. The

plantings were spread over a ten-hectare portion of Ohuia Incorporation's Tara Block, just 15 minutes from Wairoa township.

"We had done months of preparation but there was definitely a sense of urgency in that Wairoa has experienced huge amounts of rain and we just had this small window of opportunity between weather fronts," Clare says. "We put out a call for whānau to help our own workers and everyone pulled out all the stops. Agnew Transport Services left Hastings at 3.30 on the Saturday morning to bring over 22,000 trees and GPS planters and the planting crews worked tirelessly through the weekend. They even worked on Monday to get the block finished."

TTH is a subsidiary of Tātau Tātau o Te Wairoa trust (TTOTW) - the post-settlement governance entity for Wairoa, representing some 34,000 people in seven iwi and hāpu clusters. A partnership between TTH and the Māoriowned Ohuia Incorporation, the block is a joint venture in which Ohuia owns the land and TTH has provided capital for the biological assets and orchard infrastructure. Any profits are split down the middle.

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The purpose is ... to help Māori landowners build capability to create a vital horticulture industry in Wairoa

Further plantings of Envy and high-colour Royal Gala apples are planned for next season to take the trial orchard to a total of 18-hectares.

"It is a 25-year partnership, but Ohuia could, if it wanted, buy us out over time," Clare says. "The purpose is not for TTH to accumulate assets, but to help Māori landowners build capability to create a vital horticulture industry in Wairoa."

Tātau Tātau o te Wairoa trust chair Leon Symes says it's much more than an economic initiative.

"Any work the trust does has to take into account the four pillars of economic, social, cultural and environmental wellbeing," he says. "Each of those pillars must be equally strong. That's why we are also focusing on our housing initiative, on care of the environment, on how everything we do affects our land and our people."

Wairoa is a small town with a population of just under 9,000 in the Hawke's Bay region. It makes up 41,300 hectares of the region's 1.4 million hectares. It is land-rich territory: 2,000 of the available 22,000 hectares are under



With its gentle contour and proximity to the mighty Wairoa River, Tara Block was identified as the perfect spot for the trial orchards

The potential in Wairoa

- 41,300 hectares of land
- 2,000 of the 22,000 hectares are under Māori ownership and the remainder has Class 1 Land Use Capability
- Less than 225 hectares are currently in horticulture production

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Seasonsafe Medical & Travel Insurance Insurance for Seasonal Workers Māori ownership and the remainder has Class 1 Land Use Capability that is required for horticulture. Previously dominated by forestry, sheep and beef farming, fewer than 225 hectares are currently in horticulture production.

"The potential for industry growth in the region is huge," Leon says. "We didn't want to see all these big corporations coming in, doing what they want with the land and sending any benefits out of the region.

"We want horticulture to be something we do ourselves, for the good of our people."

That is not to say that TTH does not see economic success as an important driver. By the time those first Envy apples are ready for market, the group plans to have built a postharvest facility that will create up to 300 jobs along with its on-orchard work.

Work on the Wairoa Horticulture initiative began in earnest in October 2020, when TTOTW Ngati Pāhauwera Development Trust, Hawke's Bay Regional Council and Wairoa District Council were approved for a \$2.3 million Provincial Growth Fund investment. The funding was to develop a trial orchard; engage landowners to diversify into horticulture; and develop an integrated skills and training programme.

With close to 60 percent of whānau employed at the local meatworks, the idea was to reduce dependence on one industry, while increasing productivity of the whenua.

"A lot of that land is in long-term leases where the benefits don't flow back to whānau," Clare says. "We see our role as facilitating the opportunity to provide capital and expertise to help achieve better outcomes."

TTOTW are hoping to contribute an extra \$8.2 million to the local economy each year, while staying firm to its values around the environment, social wellbeing and culture. And despite some pandemic hiccups, it is well on its way. In addition to the trial orchard, it has built a database to help identify owners and pockets of underutilised whenua. Of those identified, it is supporting the owners of 25 whānau blocks in undertaking feasibility studies for the future of their whenua.

"Now we have the governance structure in place we are in a strong position to help whānau and hapū do something with their land that is beneficial for both them and the wider community," Leon says.

Chair of both TTH and Ngati Pāhauwera Commercial Development, Tom Keefe, says the initiative is both a vehicle for change and a wraparound structure for support.

"We look at the Ohuia orchard as being like a show home," he says. "We've known that horticulture could be an exciting way forward for our people and this shows exactly how it can be done."

TTOTW's new crew of cadets are well into their training, with T&G Global on board to offer support and expertise. "This is not a short game," says Clare. "It's a long one that needs to have benefits for generations to come."



Tom Keefe (left) and Rangi Manual on the Ohuia Station trial orchard

Trial orchard makes better use of shareholders' land

As chair of Ohuia Incorporation, Rangi Manual is well placed to be a partner in the Tātau Tātau Horticulture/ Ohuia Station trial orchard.

Rangi says Ohuia Incorporation was keen to become partners in the trial because it was an opportunity to better utilise land that was suited to horticulture.

"To make such a change, even with land that has mixed or multiple ownership, is not insurmountable," he says. "It just requires people to come together with a common goal."

Set directly adjacent to the Wairoa River, the newlyplanted orchard underwent some gentle contouring and tile drainage before the soil was worked up and lime applied.

Having used a GPS-assisted planting method, the team then set to work putting in post and wire structures to keep the young trees safe and supported as they mature into production.

Even at their fledgling stage, getting them in the ground was a major milestone, says TTOTW chair Leon Symes.

"What they represent is our aim to help get Māori whenua in use," he says. "If we can lift productivity there, we can help whānau lift themselves."

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Luciano Garcia is supporting the Tauranga Community Foodbank as part of a novel initiative to attract local, seasonal workers

Kiwifruit industry hospitality supports Tauranga foodbank

Giving back to the local community is close to the heart of a kiwifruit contracting company boss who says moving to New Zealand has been life changing.

By James Smith

Luciano Garcia, managing director of Papamoabased Garcia Contracting Services, has pledged to support Tauranga Community Foodbank with cash donations as part of a novel initiative hoping to attract local, seasonal workers.

The initiative, running from October through November, provides locals the opportunity to experience working on an orchard while earning a full day's pay for themselves. All workers will receive payment at the company's usual hourly rate and in return, Garcia will donate an additional \$1 per hour worked, per person, to the foodbank.

"Any group of at least five people or more can apply for this experience," says Luciano. "A group of co-workers, a class of students, a group of gym members, church members, or even a large family.

"If you have a group and you are keen to earn some extra money for yourselves or maybe for your organisation over a weekend and help our community at the same time, this is your chance!" Each participant will earn \$22.10 per hour +8% holiday pay and paid breaks. Orchards are within the greater Tauranga area.

Individual groups get to work together in the same orchard. All participants must be aged 16 and over, have a valid IRD number and legal rights to work in New Zealand.

"Experience is not needed as training will be provided and our supervisors will be with you at all times, checking and giving instructions as you go through the job," says Luciano.

...Garcia will donate an additional \$1 per hour worked, per person, to the foodbank

Donating to a foodbank was an obvious choice when it came to supporting a good, local cause, Luciano says.

"At Garcia we are all about people and giving back to our community, it's our way to say thank you for everyone's efforts in keeping our beloved kiwifruit industry running."

The kiwifruit industry is experiencing a widespread labour shortage and efforts have been stepped up by New Zealand Kiwifruit Growers Inc (NZKGI) to attract and retain people into careers.

NZKGI's communications manager, Mike Murphy, says it is great to see this type of initiative which benefits the local community.

"NZKGI is working hard to encourage New Zealanders to join our industry and tasters such as this could potentially open the door to full-time employment," Mike says.

The weekend 'taster days' will also help address a local labour shortage at a time when summer pruning is in full swing.

Overview of the initiative

- Runs from October through November
- Each participant will earn \$22.10 per hour +8% holiday pay and paid breaks
- Garcia will donate an additional \$1 per hour worked, per person to the Tauranga Community Foodbank
- Any group of at least 5 people or more aged over 16 can apply

"Some people may have never been on a kiwifruit orchard before," says Luciano. "This is a chance for them to have an enjoyable day and learn something new and earn some money towards a personal goal like a holiday or a car.

66 We have permanent jobs in operations, in orchard management, leadership roles, payroll, HR, people and culture, and pastoral care

"It might also show others what the kiwifruit industry can offer them in terms of a long-term career.

"We have permanent jobs in operations, in orchard management, leadership roles, payroll, HR, people and culture, and pastoral care. Like my experience, it could be life changing."

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For more information on the initiative, visit: garciacontracting.co.nz/good-cause

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AVO UPDATE



Meeting the season's challenges



By Jen Scoular : NZ Avocado chief executive

The avocado industry is a third of the way through a very challenging export season, with a fragile domestic market. From the supply side, the industry is looking very good. Orchards have produced well with similar volumes to last year. The size profile has returned to normal and quality is good. Export pack-out rates are also good and the trees are looking healthy as flowering to set next year's crop arrives.

But that is the end of the good news. One exporter has reported that not one vessel they had avocados on has left on schedule so far this season. Late arrivals, changes of schedule and late departures, are daily issues being managed by exporters. Avocados are harvested to meet vessel departures, so changes to timings, or worse still, changes to the destination of the vessels, are felt by the exporter, the packer – who is clearing orchards to be harvested – and of course the grower, harvesting avocados.

The New Zealand market experienced very high supply early in the season, deflating grower returns to levels we haven't seen in a decade. The positive impact is that avocados are very good value right now.

...data shows that 69% of Kiwi households buy avocados, so this is the year for increasing demand and attracting the 31% who don't make avocados part of their weekly shop



Nielson data shows that 69% of Kiwi households buy avocados, so this is the year for increasing demand and attracting the 31% who don't make avocados part of their weekly shop. Hopefully, the warmer weather will mean the start of barbeques. Who can have a barbeque without some guac, some avocado in the salad and a trendy avocado mousse or cheesecake for dessert? There is discussion across the industry as to whether a much lower return means we need to cut investment to give growers a break from levies. Our calculations show that a 20% reduction in levies might save the grower \$200 per hectare. But if that grower implemented best practice to increase productivity by 20%, they would increase their bottom line by \$2,000.

Those who have been in the industry see this year as a challenging one, but acknowledge that horticulture comes with risks. Growers have had a number of very good returns over the past ten years and are focusing on a healthy crop for 2022-23.

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Those who have been in the industry see this year as a challenging one, but acknowledge that horticulture comes with risks

We are hearing that some industry participants are being blamed for the significant amount of new avocado plantings, which are starting to place additional pressure on markets. Quite simply, the investment that growers have made over more than twenty years has built the industry into a more attractive option for investors.

Grower investment has added industry robustness through systems, market access and development, research, biosecurity and a collaborative supply chain. Packers and marketers have increased capability and invested to improve the value chain to support the delivery of quality avocados to our consumers. It's this industry strength and the returns that have attracted new production.

Horticulture isn't for the risk averse. There are wonderful opportunities but there will always be down years, pests or market issues. The best value we can add right now is to maintain the investment to ensure that all future avocado crops have willing consumers, eagerly waiting for the arrival of avocados in the market.



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Figure 1 Return flower after a 4th leaf 60 t/ha crop of Breeze M. A good return bloom after an appropriate crop load set last season

Thinning – setting up the crop for a picture-perfect harvest

"Growing is easy, just don't screw anything up," said the late, great John Wilton.

By Jack Wilson : AgFirst horticultural consultant

Hand thinning is a time where we are trying to obtain a uniform crop, with a canvas that is commonly anything but uniform in tree size, vigour, or fruit set. Good luck to us.

Covid-19 is not going away in a hurry and the resulting disruptions are testing businesses, including orcharding. Orchards need to manage what they can and focus on areas that have the most significant impact.

Hand thinning, whether simple or detailed, can have a positive impact on an orchard's operation. The simple approach is often focused around reducing the labour cost to a minimum, commonly resulting in poor crop load uniformity. Where it gets detailed is where a grower is striving for excellence and aiming to achieve high-pack-out percentages – a result from being more objective in your management. Funnily enough, the simple hand thinning approach often leads to a greater level of complexity in

the future and visa versa. A detailed, well-thought through hand thinning strategy leads to an easy to manage crop for this season and seasons to come.

Developing a hand-thinning plan

Identifying your market requirement should be high priority when developing a hand thinning plan. The priority of a thinning programme will depend on:

- Fruit size When large fruit size is a critical market requirement (for varieties such as Queen and Envy™), high priority needs to be given to early hand thinning in order to maximise fruit size potential.
- Biennial varieties Blocks that are going into their 'on crop' season need to be hand thinned early. It is critical to reduce the seed load on the tree as early as possible, giving it the best chance of eliminating the biennial swing in seasons to come.

TECHNICAL



Figure ² An example of a monitor tree used to estimate an appropriate crop load within a block

- Chemical thinning response Blocks that have had an excellent result from the chemical thinning should only require a minor hand thinning job and therefore can afford to be left later than other high priority blocks. Generally, overcropped trees need urgent attention to reduce the risk of poor fruit size, colour and the inducing of biennial bearing.
- Labour With labour potentially being a limited resource this year, high priority should be placed on blocks with high margins. Heading into the hand thinning period, it is well worth ranking your blocks by financial performance. This will provide helpful information leading into harvest, allowing you to allocate resources accordingly.

See figure 1.

Quantify, quantify, quantify

Generally, there are three crop loading techniques used to identify what a block's optimum crop load should be:

- Truck cross-sectional area (TCA) A measurement of the size of the trunk to provide an indication on what the tree's cropping potential is. This method is excellent in young trees as the canopy continues to develop. For example, in a young Envy™ tree the general rule is to aim for ten harvested fruit per cm² TCA. Twelve fruit per cm² is the upper limit, a crop load above this will start to compromise canopy growth.
- Tree row volume With a good understanding of what a mature canopy volume and the corresponding crop load is likely to be, you can use an estimated proportion of full canopy to set an appropriate crop load on your block.



Figure 3 A crop loading Mafcot wheel used to set fruit number per BCA during hand thinning

• Cropping history - Use the block history and industry benchmarking tools to estimate an appropriate tonnage, keeping in mind size, colour and other aspects of fruit quality.

Pre-thinning counts are essential to ensure the trees within a block are holding an appropriate crop that takes into account their growth stage and production targets. Generally, there are two strategies to do this.

Strategy one: Use 'monitor trees' to set thinning rules Assessing monitor trees involves selecting a set of trees typically four per hectare - identifying the preferred fruiting sites, and with an experienced thinner, thinning to a crop load that looks and feels right. The look and feel of the crop load on the tree will depend on the variety and will be based on past experience and knowledge of the block. Then count the fruit on these monitor trees and adjust the fruit numbers to match targets. Analyse the adjustments you made and develop **simple rules** that are going to make for an accurate job when done across the whole block by the thinning team. See figure **(2)**.

Strategy two: count fruit clusters and number of fruit before thinning

Another option, which some growers prefer, is to count the fruit on the monitor trees pre hand thinning, recording the cluster number and the number of fruit in each cluster. This is typically a two-person role. An example is shown in Table 1 below. The average tree was carrying 324 fruit post chemical thinning, with 109 singles, 55 double and 35 triples. Simple maths says thinning all 2s and 3s to singles will achieve a target number of approximately 200 fruit per tree post hand thinning.



Figure 4 These Scilate were thinned, fist width apart, in mid-November. This crop has been well thinned and spaced, therefore if the crop is deemed 'too heavy' in January it can be re-thinned without risk of sunburn injury

No of fruit per cluster	Cluster No	Fruit No	Thin to singles
1	109	109	109
2	55	110	55
3	35	105	35
4	0	0	0
5	0	0	0
		324	199

Table 1 Cluster counts pre hand thinning

Investigate helpful crop loading tools

With more intensive, formal canopies such as slender spindle, Future Orchard Production Systems (FOPS) or 2D, a variety of tools have made it very easy to quantify metrics such as fruit per tree or fruit per branch. One example is a Mafcot wheel (figure 3), which gives the appropriate fruit number per branch for the corresponding branch cross-sectional area (BCA) as measured at the base of the branch.

How to decide which fruit to carry on which site

As well as fruit number, identifying which fruit to carry plays an important role in every season whether you are struggling with labour or not. Your pre-thinning counts will determine how many fruit you need to remove from each tree and what you need to leave. The astute manager knows that not all fruit are the same. Consideration of the intrinsic fruit attributes will aid you in selecting the best fruit available to leave on the tree. For example

- Fruit on terminal buds are the best.
- Fruit on lateral bud of one year wood are the worst.
- A large fruit at thinning is the largest fruit at harvest.
- Fruit will colour in doubles on the outside of the tree but may not on the inside, it may colour in the tops but not the bottoms.

Thinning priority needs to be on fruit off the weakest fruit buds, and spacing fruit out on the good quality bud. Where it is necessary to carry doubles to make up fruit numbers, priority needs to be given to leaving twos on terminal fruiting sites or spurs with bourse shoots.

Many of our specialist high value niche market varieties have very good premiums for large fruit. Therefore, it is advantageous to have a thinning team well aware of the importance of fruit placement and bud selection when thinning.

Secondary hand thinning or grooming in January and early February is advantageous for high value varieties to remove 'out of specification' fruit and decrease the high harvest and packing costs. See figure 4.

PEOPLE ARE EVERYTHING

Training

In recent times, the development of the Recognised Seasonal Employer (RSE) scheme programmes has given us a high proportion of well skilled, experienced workers returning year after year. With continued uncertainty around labour supply, it is likely that the number of unskilled thinners will increase, making training pivotal.

In many orchard activities that require a large team, regardless of their experience or skills, communicating and supervising simple rules is the most effective way to obtain an accurate outcome. Developing simple rules at hand thinning removes the complexity for the team doing the work. It is up to the manager to ensure those rules will provide an even, high quality result.

The development of hand thinning rules needs to be focused on both production goals and a clear understanding of which fruit and sites are preferable. The more fruit in preferable sites with a good light environment, the easier it will be to harvest.

TECHNICAL



Figure 5 An orchard using flower density mapping to alter the chemical thinning strategy in order to set a uniform crop throughout the block

For example, hand thinning rules that are easily conveyed or demonstrated, and with good supervision, can be tweaked as required are:

- Space the fruit into singles a hand span apart (always leaving the largest fruit)
- Space into singles a fist space apart
- Thin all fruit down to singles (no spacing)
- Leave all fruit in doubles
- Leave doubles in these locations (e.g. tops, on bourse shoots, in good light).

the majority of 3D orchard systems out there still rely on the use of picking buckets and ladders



Recently, growers have invested heavily in platforms to assist with labour effectiveness in the orchard. However, the majority of 3D orchard systems out there still rely on the use of picking buckets and ladders. Some say ladder work is an art and still a very important part of thinning so there needs to be good instruction on the best methods to work a ladder, maximising efficiency with minimal physical effort. Learning how to 'walk' a ladder as opposed to lifting it, as well as proper placement, is key to using ladders effectively.

Monitoring

Every year we notice a large difference in the quality of hand thinning among thinners. Active care and supervision is required in order to iron out these variations.

To achieve an accurate hand thinning job that takes into account production targets, fruit quality goals and tree growth requirements, you must be thinning by counting fruit at a tree and often branch unit level. These counts need to be expressed as fruit number per cm2 BCA to ensure a uniform crop load. There has been a range of research completed to find the optimum crop load specific to different varieties and canopy systems. But whatever the number is uniformity in your crop is essential, especially where there is a wide variation in tree vigour and fruit set. Without fruit counting weak growing, heavily cropped trees you will almost never get them thinned down to optimum crop load, resulting in a reduction in canopy development and therefore yield potential in seasons to come. Pick-out is a key aspect to be thinking about when preparing for hand thinning. The pick-out is the amount of fruit lost between hand thinning and harvest. Different varieties will have different pick-out percentages, however it is best to work off 10% fruit loss as a minimum. Most varieties sit around the 10% level, however varieties like Scifresh (with no stop drop sprays) can reach pick-out levels of up to 30%.

Becoming more objective in our orchards

The key to adopting a detailed thinning strategy is to use data like block history and production targets to help you make accurate informed decisions.

Using data is not new. Growers have been using a range of easy to collect measures for time immemorial to understand how their orchard is performing year by year, block by block (or neighbour by neighbour) to assist in making informed decisions. See figure **5**.

What *is* new, is that the increasing sophistication of industry with access to new agtech, greater emphasis on quality and consistency in the market, and pressure from rising labour and input costs, require far more complex decision-making.

Development of new tools capable of the capture and evaluation of a greater range of data has also resulted in increased interest in more complex indicators that measure not only output but also take into account costs to give measures of overall business performance, such as profit/ hectare or profit/kg.

The metrics that matter to you in your decision-making may not be the same ones that matter to others, but there are some common indicators that can be used, especially during the hand thinning period, to guide orchard management to inform understanding and improvement of business performance. ●

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Figure 1 2D Jugala

Apple growing systems – innovation central

Has there ever been a time when the apple industry has been planting new orchards on so many different growing systems? Don't think so.

By Jack Hughes : Fruition horticultural consultant

The creative energy and diversity are great. It does beg a question – is there one system that's better than the rest? Or with the right management, can any of them excel?

In this article, I will discuss the fundamentals that will determine the answer to this question. To kick off, I have assumed that the fundamentals are:

- Economic efficiency the time value of money,
- 2 The rate of yield accumulation and the level of peak yield,
- **3** Labour efficiency,
- 4 The ease of maintaining of balanced canopies.

Let's explore these inter-related factors.

Economic efficiency

The internal rate of return calculation (IRR) is one of the best ways to compare the return on an investment. It considers the net present value of all cash flows (both positive and negative) from an investment (in this case a growing system).

IRR is a good measure because it combines all the inputs and outputs into one number - making comparing different options easy. It's also good because it accounts for a fundamental reality: the time

value of money. The more that is spent early on either, as capital development or labour, the greater the impact on IRR.

This hard reality can be interpreted in different ways. A glass-half-full approach says it's ok to invest big in systems that require a lot of infrastructure and tree training because



Figure 2 High density versus trellis



Figure 3 FOPs at Rockit Orchard Limited Partnership, Home Orchard

that will make life easier down the track. A glass-half-empty view says be frugal with set-up expenditure as you have got to be sure you can pay it back, plus some. The bigticket items here are:

- The cost of trees planting density
- Support structures whether crop load bearing
- Canopy design the time input required for tree training and maintenance.

We'll come back to these.

The rate and level of yield accumulation

The faster a new orchard gets into production and the higher that yield, the better, right? Yes, so long as fruit value is not compromised at the expense of high yield and so long as these big yields don't mess up the trajectory of getting and staying there. Managing crop load over the establishment years to produce the highest value crop without compromising the rate of canopy development is a critical element of success.

Labour ease and efficiency

We have to expect the double whammy of the cost of labour continuing to go up and the availability of skilled labour continuing to decline. This new normal increases the inherent value of growing systems that minimise the total labour requirement and the level of skill required. Arguably this factor will only continue to grow in importance over time.

A system's suitability for mobile work platforms is a factor here. The main advantage of platforms is that they broaden the pool of people that can participate. While that is a worthwhile benefit, we are still assessing whether platforms deliver an economic gain after their cost of capital.

The plot thickens if time critical jobs can't be completed when they need to be and there is a high downstream cost. This applies to systems that require fruiting wood to be tied down as it grows. If that window is missed, wood that has got too big to be trained has to be pruned out. This is where there is value in growing systems that have simplicity and flexibility built into their design. This is leads into the next factor of system design.



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Figure 4 Twin stem Aztec Fuji



Figure 5 Mature hedged canopy

Simple balanced canopies

All of the new growing systems have canopies that are narrower or more planar than their 3D predecessors. Planar canopies lend themselves to better light penetration and easier access for labour efficiency. Platform compatibility is a plus for growing systems with row widths and canopy depths that suit them.

The new planar canopies use different options for the orientation of fruiting wood:

- Horizontal ie 2D (figure 1), V (figure 2)
- Vertical ie FOPs (figure 3)
- Free form ie 3D, Twin stem (figure 4), Hedged (figure 5)

Here we are focusing on the fruiting wood rather than the tree's structure. In 2D and V, the fruiting wood coming from the vertical main stem is tied down onto horizontal wires. In FOPs the main scaffold stem is horizontal and the slim fruiting branches are vertical.

Traditional Tall Spindle 3D uses replaceable fruiting branches coming from the vertical main stem. They are often tied down initially into a pendant position and are 'free form' after that. Twin stems are essentially smaller versions of the same thing with two leaders instead of one. Mechanically hedged, or 'fruiting wall' canopies, can be single or twin stem with the difference that the canopy profile is trimmed to pre-determined dimensions.

New shoot growth tends to be vertical, so the question with respect to simple, efficient canopy management is: how much of that new growth can be kept and used and to what extent does it need to be modified? It is a downside if most new growth has to be repeatedly removed or manually trained. This appears to be an additional and ongoing cost with the systems that use horizontal fruiting wood.

The easy to ask but hard to answer question is 'What does it take to establish each growing system and then how easy is it to maintain it? There is this conundrum that 'simple in design' and 'easy to manage' are not the same thing.

Big ticket items

Let's consider some of the major capital and development items in a bit more detail - the trees, their training and the structures that support them.

Does the structure carry the crop load?

Dwarf rootstocks are not self-supporting and the trees growing on them require trellising to hold them upright and straight. This support ideally should extend to the tops of trees to allow weak wood near the tops to carry fruit. It's important to keep the whole canopy vertical and prevent the start of a lean that can lead to catastrophic breakage of whole rows.

If the weight of the crop is borne on the structure, then the engineering specification and spacing of the posts and wire must increase. Naturally, this affects the whole cost which is an important factor influencing payback and IRR.

Tree density

Tree density also influences establishment cost. The rate of yield accumulation in the early years is largely a function of tree density. While higher tree densities favour more rapid yield accumulation, unless this additional expenditure is back by extra yields in the early years, the money is wasted. There aren't black and white definitions of relative density There aren't black and white definitions of relative density, but in today's context, let's assume that less than 2,000 trees per hectare is low density. Two to three thousand is moderate while north of three thousand is high.

If high tree densities lead to crowding and shade problems later in the life of the orchard, then hindsight says the density is too high. It's a fallacy that tree to tree (or root to root) competition in very high-density situations reduces overall vegetative vigour.

Low tree density favours a settled balance in mature canopies because each root system is supporting a relatively large canopy. This factor has been incorporated into the design of the Future Orchard Production System (FOPS), which uses tree densities of less than 2,000 trees/ ha. There is the element of the hare and tortoise in this race, with FOPs being a little slower out of the blocks but finishing strongly.

Rate of canopy development

The rate of canopy establishment underpins yield accumulation, and this is not directly linked to tree density. The genetics of the rootstock clearly influences growth rate and precocity as does the way the tree is pruned and trained from the time it is planted. If, for example, a standard, single-stem nursery tree needs to be cut back at planting to regrow two new leaders, then there is an expensive set-back involved.

Years ago, there were pressure put on nurseries to produce trees with useable branches. If trees had enough useful branches, above a required minimum height and with flat angles, they would be well set-up to produce fruit from the spurs that developed on these branches in their second leaf. The engine for early yield accumulation.

The trend now is to remove all the branches at planting and start with a rod. Sure, this may be justified when branches aren't consistent, or the trees aren't well grown or graded. Achieving uniformity in a block from the outset is important for downstream management.

180 tonnes per hectare

FOP's is unique with its combination of ultra-narrow canopy and very narrow rows that give the systems its fruiting capacity. The published yields are extra-ordinary so the system can't be overlooked, but it is a big commitment system in terms of capital and labour input. This includes the load bearing support structures and the installation of bamboo poles to train each of the 17,000/ha upright fruiting branches.

Optimising the system also requires manual bud thinning in winter and hand thinning of the crop as chemical thinning is deemed too risky on the 'easily shifted' vertical stems. These different approaches challenge conventional thinking.

Other important factors

Protecting the crop from hail and sunburn with overhead netting must be considered given the financial investment at stake, the increasing cost of insurance and the desirability of ensuring customer supply. How suited is each growing system to net installation either from scratch or retrofitted as the crop comes in?

Market access and disease risk are also important factors. Apple leaf curling midge (ALCM) and woolly apple aphid (WAA) are zero tolerance pests for sensitive markets, so it makes sense to minimise the risk of incidence. Late season ALCM populations are closely linked to the presence of their preferred habitat i.e., actively growing shoots. A growing system that reliably terminates extension growth by Christmas fits the bill here.

Rootstock susceptibility to WAA influences the populations of this pest. M9 clones are WAA susceptible and Geneva stocks are not, so there is a clear choice here. The same applies to fire blight. M9 represents an inherent risk with this episodic disease that can wreck orchards in the bad years. What value should be put on the hardwired fire blight resistance of Geneva 202 and its lower vigour cousin, Geneva 41?

The factors discussed in this article are summarised in Table 1. They are not 'hard and fast' and are up for debate. The fun question to ask is 'what growing system would you go with if you were planting a block?' ●

What growing system would you go with if you were planting a block?

Table 1. Typical metrics and features of different growing systems

System	3D	Twin Stem	2D	FOPS	V	Hedged
Row width (m)	3.5	2.75	2.75	2.2	3.7	2.75
Tree spacing (m)	1.5	1.2	1.5	2.4	1	1.5
Density (trees/ha)	1905	3030	2424	1894	2703	2424
compare with 3D		59%	27%	-1%	42%	27%
Crop load bearing support structure	no	no	yes	yes	yes	no
Orientation of fruiting wood	free form	free form	horizontal	vertical	horizontal	free form
Amount of modification/training if starting with a standard nursery tree	little	a lot	little	a lot	little	little
Suitability for platforms	not ideal	doable	yes	a squeeze	not ideal	yes

Supporting summerfruit grower agchem choices



By Richard Mills : Summerfruit NZ market support

In a previous life, I got the chemicals out of the shed, usually after a discussion with my spray rep, added them to the tank and away I went. When I moved to research and development work, there was a bit more involved as the products sometimes needed to be imported into New Zealand. But generally, things weren't too complicated as there were other people taking care of the details.

At an industry body level, such as Summerfruit NZ, there are many more aspects to consider.

Products

New agrichemical products are designed, researched and tested by the manufacturers and once ready, approval is sought through the Ministry for Primary Industries to register the product under the Agricultural Compounds and Veterinary Medicines (ACVM) Act. If approved, the retailers can sell the new products to growers and do their own field testing as necessary.

Products are sold on-label where there is a claim but can also be used legally off-label so long as the New Zealand Maximum Residue Limit (MRL), or that of any importing country, is not exceeded. By knowing the appropriate pre-harvest interval (PHI) we can be sure that the MRL will not be exceeded. To know the PHI requires research. For smaller product groups such as Summerfruit NZ, chemical companies are not taking on this research, therefore the work must be carried out by ourselves.

Regulation

Summerfruit NZ has an Export Marketing Strategy under the NZ Horticulture Export Authority enabling summerfruit to be exported. Part of the strategy requires an annual update of the MRL and PHI information, which was done this year with help from Market Access Solutionz, AsureQuality and Fruition Horticulture.

This is the information that forms the 'rules' from which AsureQuality can produce the Harvest Clearance Certificates from submitted spray diaries. Other spray diaries apart from CropSure can be used, but they must be compatible with CropSure otherwise a manual handling fee will be incurred.

This same information will form part of the agrichemical retailers' spray wall charts and help manufacturers decide where to focus their attention. These charts will show where there are changes to products, where products are withdrawn, and where a shortened PHI is highlighted. Once compiled, the information is taken to our Export Reference Group, confirmed or amended and uploaded onto the Summerfruit NZ portal. A printed copy of the export apricot and cherry MRL and PHI charts are sent to export growers. This year, for the first time, a printed copy of the New Zealand Market PHI chart has been sent to all summerfruit growers.

Compliance

To support the regulations, there is a suite of auditing and compliance required - some of it dictated by the Export Marketing Strategy. For example, the Residue Monitoring Scheme requires the random sampling of export-ready fruit to check for compliance with MRL requirements. AsureQuality manages the process for Summerfruit NZ, and in turn, we are audited by SGS. Also, growers may need to register for the Summerfruit Official Assurance Programmes (OAPs) which ensure that products for export meet the agreed phytosanitary protocol of an importing country by for example requiring inspection for the presence of certain insects (and appropriate control measures such as fumigation) before fruit is shipped.

While the agrichemical section of NZGAP (Good Agricultural Practice) and GlobalG.A.P. is just a part of the overall audit, it in effect validates our ongoing ability to apply agrichemical sprays to trees.

Spray diaries and the subsequent Harvest Clearance Certificates are issued to growers and packhouses. Spray diaries are collected and collated. From these records we can monitor changes over time and respond to queries such as the recent call for information on glyphosate use.

Extension services

Holding the information is all well and good, but we also need to use a variety of means to communicate any changes to the wider industry. These include Market Access Solutionz and AsureQuality presenting technical information, Summerfruit NZ producing its SummerGreen manual and holding SummerGreen meetings and communicating changes in conference presentations and

through the *Prunings* newsletter. Another key method is via retail representatives who need to keep up to date to ensure the correct information is passed on to those that need it.



TECHNICAL







Research

For a product group of our size (covering in total about 2,300 ha), research funds are always going to be under pressure. In past seasons we have had some good work into disease control done by Plant & Food Research with funding assistance from MPI through Sustainable Food & Fibre Futures and its forerunners.

Reports from Market Access Solutionz, Plant & Food Research and others have highlighted that there is a reasonable probability that the older chemistry, especially insecticides, will fairly soon be withdrawn from use. The most recent example being the United States Department of Agriculture making the chlorpyrifos MRL nil detectable from early 2022.

With limited new chemistry coming our way and the pending withdrawal of older products, the summerfruit industry needs to find new ways to continue to produce top-quality safe to eat fruit for local and export markets. A Lighter Touch (https://a-lighter-touch.co.nz/) is a panhorticulture sector initiative that aims to address these issues. ALT has drawn together the resources of many of the product groups, the agrichemical manufacturers and retail sector, as well as research organisations.

At this point Summerfruit NZ is participating in *A Lighter Touch* programmes to test another insecticide and specify a suitable pre-harvest interval. We are also involved in the agroecology project on citrus *Milestone 6.2 Enhancing agroecosystems for classical biological control* and looking forward to the results of soft chemistry control of some diseases.

While A Lighter Touch will not necessarily grow the size of the summerfruit industry, it does help to work with larger fruit groups, as well as groups in the arable sector.



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Haven's products are acknowledged by seasonal accommodation providers, backpackers, holiday parks, council-operated and student accommodation facilities. Haven is the product developer, importer and distributor of commercial furniture and mattresses, and is well known for its consistent high-quality products and service, and full safety standard compliance of products designed for commercial use.

Haven's bunk beds comply with the AS/NZS safety standards, providing a level of safety awareness and minimising risks, and the importance of using only fully compliant and certified bunks in accommodation facilities cannot be understated.

The AS/NZS 4220:2010 bunk safety standard covers Australia and New Zealand, and was further enhanced with the introduction of the accommodation industry Handbook Standard (HB393:2011) in 2011, providing additional specifications and guidance for short-term accommodation providers relating to the purchase, installation, maintenance and the use of bunk beds in facilities.

The standards include many specific and detailed design and manufacturing requirements and approval processes. Haven's products comply and are fully certified to these standards, giving accommodation providers peace of mind.

Haven Commercial offers an extensive range of safety compliant products to the commercial sector, providing a direct-from-source purchase at competitive prices, with nationwide distribution. "We look forward to helping growers and seasonal worker accommodation providers plan their sleep system requirements."





For more information contact Roger or Scott Harris, Haven Distributing Co Ltd Commercial Division on **09 213 3024** or email **sales@havennz.com**

Grochem – Lending a hand to support our grower communities

Four years ago, the team at Grochem decided to do something a little different from the norm. Over the last four years Grochem has contributed \$200,000 in donations to the charities listed below.

Grochem wanted to make a difference to our grower communities and support charities we believe can help benefit our local communities.

Supporting the families of RSE scheme workers from the Penema region, Vanuatu

UNICEF New Zealand - Water and Sanitation Health (WASH) campaign. A project to bring clean water and latrines to 10,000 children from 83 schools in the Penema region of Vanuatu. UNICEF's goal is firstly to provide education on the importance of cleaning your hands properly, and also to provide schools with toilet facilities that are clean and fit for purpose. Thanks to the New Zealand Ministry of Foreign Affairs & Trade and the Vanuatu government along with UNICEF New Zealand, that have made this all possible. Grochem's donations to this cause have helped to make this goal a reality. Just by having clean water close to the toilets, and education on why it is important to wash your hands after toilet use and before eating is saving children's lives.



Hawke's Bay Cranford Hospice and Nelson Tasman Hospice

Grochem is proud to support these amazing people who in times of need are there to support us and our families. Many of us have already experienced the valuable care that the hospice services provide our community. The hospice doctors, nurses and support staff go to great lengths to ensure that our needs and the needs of our family are met during those times in life that really matter most.



Prostate Cancer Foundation NZ

It is only when prostate cancer affects someone close to you that it becomes real to you. More than 600 men in New Zealand die from prostate cancer every year. Early detection is key, many men don't have symptoms when first diagnosed. Early diagnosis and effective treatment save lives. Typically, men don't know how dangerous this disease is, so awareness is a major factor.

Grochem want to bring prostate cancer to the attention of men in the horticulture community. Start by having a chat with your doctor. Especially if you haven't seen a doctor for a while, make an appointment.



Rural Support Trust

We are proud to support this very worthy cause. The Trust is about "rural people helping rural people".

Sometimes you need to chat with someone who understands your issues. Rural Support Trust has local rural people who know from experience that pressures can mount up in all areas from health and well-being to financial pressure or employment matters.

Contact them for a confidential chat on 0800 787 254 or visit rural-support.org.nz



ABC Software expands spray diary to full agrichemical module

ABC Software has introduced an Agrichemical module to ABCgrower, a cloud-based software tool used to digitally record on-orchard work.

The Agrichemical module now records dry applications and tracks nutrients on orchard. This adds functionality to the existing spray diary that is used to plan, calculate, instruct and record spray applications, bringing efficiencies to a spray regime.

The new module can publish and lock records to meet compliance regulations and has take to market functionality to show customers the provenance of the fruit. New Zealand apple growers can upload records directly to CropSure.

The Hawke's Bay based horticulture software specialist ABC Software is planning to add fertigation recording to the module in the coming weeks.

"We recognise that growers are looking for more in-depth information about their soil nutrient levels," says Sharon Chapman, ABC Software director.

"We are incorporating a Nutrient Analysis Report that provides a grower with visibility to the nutrients applied to all blocks across the season, or whatever period they choose. This will allow insight into the contribution fertilisers are making to the fruit.

"It will also help growers meet their environment and waterway responsibility."

The module also includes a consumables stock register for chemicals and any other items the orchardist wants to track.

The inventory control system allows for multiple stock locations. Stocktakes can be done in real time from any mobile device with an internet connection. Automated entries for chemical usage are made on the completion of a spray or fertiliser application. Batch numbers can be recorded for chemicals in both the stock register and on agrichemical instructions for compliance and traceability.

In addition to expanding the Agrichemical module, the ABC Software team is reporting good uptake of its Onsite log.

This allows a view of who is on site at any time. Visitors and workers can sign themselves in and out, and be required to answer a set of questions, for example health and safety questions with respect to Covid-19.



ABCgrower's expanded Agrichemical module incorporates a diary for spray, dry and fertigation applications

A photograph and GPS location can be recorded when a worker signs in and out. Alternatively, supervisors can sign in a group of workers and quickly and simply set start and end times for the day.

Another ABCgrower module - Quality - provides real-time information to ensure quality standards are being met.

In-field assessments are done on customised templates, be it for workers, harvested fruit, trees, plants or anything else. Defects, evaluations, and observations can be recorded. The data is presented to make it easy to improve productivity.

"This module makes quality work more effective and responsive so a grower can be more confident that their operation is working at optimal levels," says Sharon.

ABCgrower is mobile responsive. All the new features are available on any device with an internet connection. The Quality module is also available on ABCgrower Mobile, which works offline. ●

T: Sharon Chapman **021 223 6991** E: **sharon.chapman@abcsoftware.co.nz www.abcsoftware.co.nz**



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