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FRONT COVER:

It's nearly pollination time and time to bolster your bees.

Photo by Jamie Troughton/
Dscribe Media

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LETTERS

The *New Zealand Kiwifruit Journal* welcomes letters from readers.

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Contributors



Dave Black

Dave Black has a degree in Social and Environmental Science, graduating from London Guildhall University in 1981. He started beekeeping part-time in the United Kingdom, before moving to a full-time position with a commercial apiary near Te Puke a decade later. He then moved into kiwifruit, spending 20 years in the post harvest industry, 10 of them managing pollen harvests. He now writes for the *Apiarist's Advocate*, and has collated all his bee research at www.beyondbeebooks.substack.com.



Pike Stahlmann-Brown

Dr Pike Stahlmann-Brown is a research affiliate at Motu Economic and Public Policy Research. A professional economist and hobbyist beekeeper, Pike has led the annual New Zealand Colony Loss Survey since its inception in 2015.



Niloofar Shahidi

Dr Niloofar Shahidi is a crop modeller at the Bioeconomy Science Institute, working on process-based modelling of kiwifruit growth, development, yield, and fruit quality. She has a PhD in biomedical engineering from the University of Auckland, as well as a Master's degree in bioelectronics from the Iran University of Science and Technology.



Patrick Dawkins

Patrick Dawkins is the editor of *Apiarist's Advocate* eMagazine and website, www.apiaristsadvocate.com, and podcast *Apiarist's Advocate Pod*, all media serving the New Zealand apiculture industry. Since 2018, he has owned and operated Pyramid Apiaries, a small commercial beekeeping business in Marlborough providing pollination services, queen bees to the wider industry, and honey production.



Shane Max

Shane Max has more than 40 years' experience in horticulture, including the past 24 years with Zespri supporting growers to produce the world's best kiwifruit. He is now transitioning to GroWise, the independent horticultural consultancy he is building with Sophie Merwe, where his passion for applied research, extension and helping growers achieve practical, sustainable outcomes remains as strong as ever.



Sophie Merwe

Sophie Merwe has spent 20 years working across the kiwifruit industry, holding roles at Zespri in Technical, Communications and Global Extension. She co-founded GroWise with Shane Max, a horticultural consultancy focused on independent advice, project delivery and capability building. Sophie is passionate about helping growers and the wider primary sector thrive.



From the editor



Reece Unwin

Reece Unwin is commercial manager at Kiwi Pollen and has been with the company for three years. He is involved in all aspects of the business, including pollen harvesting, production, sales, marketing and technical support. Reece works closely with growers throughout New Zealand on pollen supply, supplementary pollination and application technology, supporting orchard productivity through practical, science-based solutions.



Melissa Broussard

Dr Melissa Broussard works for Bioeconomy Science Institute, specialising in crop-pollination and plant-insect pollination interactions. She has 16 years' experience investigating pollination strategies for field and horticultural crops including non-honeybee insects, artificial pollination, and the impacts of changing climate on pollination.



Welcome to the August 2026 edition of the *New Zealand Kiwifruit Journal*.

One of the great privileges of this job is the chance to get around New Zealand and talk to growers in their own back yards.

After 14 years of editing this publication, I've yet to find a boring grower, further confirming that old journalism adage that everyone has a story and that everyone has something interesting to share, if you just take time to find it.

Not that you need to look too far with someone like Richard Pentreath, who we've profiled in this edition, ostensibly because of the Kellogg Rural Leadership research project he put together but actually because he's just a really interesting guy.

I first met him during his tenure at Zespri more than a decade ago and it seems like he's had more than a dozen fascinating careers since.

Speaking of which, Shane Max's long tenure with Zespri is coming to an end but an encore career beckons as a horticulture consultant, pairing up with Sophie Merwe to form GroWise. We're lucky enough to have them both writing articles in this edition, with hopefully many more to come.

It seems a good time to remind our readers that this is an independent, industry-led publication and we welcome a range of views and contributors. With pollination rapidly approaching, we've enlisted a number of experts to help you approach this tricky time of year from a number of angles.

As has been said many times in these pages over the years, collaboration is a massive reason the kiwifruit industry has reached current heights, and this edition is yet another fine example of many voices, one tune.

Enjoy the read!

Jamie Troughton
Editor

Students from Francis Douglas Memorial College get lessons in soil biology from Hawke's Bay's Richard Pentreath.

Photo by Jamie Troughton/Dscribe Media

From the forum

Whetu Rolleston - Chairperson

It is satisfying to have another harvest behind us and to reflect on what has once again been a significant collective effort. From growers and orchard staff through to packhouses and exporters, our industry continues to deliver at scale in what remains a challenging global environment.

As growers, we now turn our attention to the market and look forward to seeing how this season's fruit performs with consumers around the world.

Over recent months, I have enjoyed catching up with many growers at both Fielddays and the NZKGI roadshows. These events are an important reminder that our industry's strength comes from the ongoing engagement of growers. Thank you to everyone who took the time to attend, ask questions and share your views. Those conversations help

ensure NZKGI remains connected to the issues that matter most and continues to advocate effectively on growers' behalf.

Growers should by now have received NZKGI's Annual Report, which includes the second edition of the Kiwifruit Industry Performance Report. I strongly encourage you to take the time to read it.

One of NZKGI's core responsibilities is improving transparency and accountability across the industry, and this report is an important part of that commitment. It provides independent analysis and insight on a wide range of topics, helping growers better understand industry performance, the factors influencing returns, and where opportunities and challenges exist for the future.

I also encourage growers to sign up to the new NZKGI Grower Hub which

can be found on our website **www.NZKGI.org.nz**.

As NZKGI has grown in capability, so too has the amount of valuable information, analysis and tools we are able to provide to growers. The Grower Hub has been developed to ensure that levy-paying growers can easily access resources such as the Industry Performance Report, cashflow tools, labour market resources, supplier accountability information and other grower-focused content.

Over time, it will become an increasingly valuable resource for growers looking to stay informed and make well-supported decisions.

At the time of writing, the unblinding of supplier scorecards has not yet occurred but by the time you read this they should be available through Zespri Canopy.



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This has been a long and, at times, arduous process, with NZKGI advocating for greater post harvest transparency over many years. While there is still more work to do, the availability of unblinded supplier performance information is a significant milestone and a positive step towards greater accountability and improved decision-making for growers.

The renewed discussion around China is one of the most significant strategic conversations currently facing our industry. As that conversation evolves, NZKGI's role is to ensure growers have access to clear, balanced information, understand the issues being considered, and have opportunities to share their views.

We will continue working with Zespri on behalf of growers, seeking clarity where questions exist and ensuring grower perspectives remain central to the discussion.

Another important discussion is the potential commercialisation of Green146. As we get closer to a decision, it is critical that growers have the time and information needed to properly evaluate both the opportunities and risks.

NZKGI will be focused on ensuring growers have a sound understanding of the variety's growing characteristics and performance, as well as how it may be managed commercially through matters such as licensing, pooling arrangements



and any transition settings. The better growers are informed, the better they can make decisions, and that must remain a priority throughout the consultation process.

Finally, congratulations to all participants in this year's Young Grower of the Year competition and to everyone involved in delivering Cultivate Your Career. These initiatives are helping build the future leadership of our industry and showcasing the many opportunities available within it.

The calibre of competitors was outstanding, and it was wonderful to see such strong support at the gala dinner. Investing in people is every bit as

important as investing in orchards, and the passion, talent and professionalism on display should give us all confidence about the future of New Zealand's kiwifruit industry.

As we move into the second half of the year, we'll need to continue to demonstrate that our industry can adapt, innovate and work together. If we remain engaged, informed and focused on the long-term success of growers, I believe the future remains very bright.

Whetu



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Modelling kiwifruit for better quality

Kiwifruit is a complex perennial crop, and many of the decisions made on a day-to-day basis can have an impact months - or even years - in the future. For growers and the wider kiwifruit sector, understanding these relationships is important for supporting more informed decisions under variable seasonal conditions.

Niloofer Shahidi, known to most of her colleagues as Niloo, works as a crop modeller within the Bioeconomy Science Institute (BSI).

Her role focuses on developing a mechanistic model of kiwifruit that can represent how the crop grows, develops, and responds to different environmental conditions and management practices.

Niloo's current work is centred on a continuous, process-based model for Hayward. The model is designed to simulate key aspects of kiwifruit development, including phenology, fruit growth, yield, and fruit quality. Rather than focusing on a single response or one season in isolation, the model runs continuously over multiple years. This is particularly important for perennial crops such as kiwifruit, where the effects of one season can carry over into the next.

A major part of Niloo's work involves translating biological knowledge into mathematical and computational descriptions. Her background is in bioengineering, where she completed a PhD and worked on mechanistic and mathematical models of human cells and organs.

When she joined BSI 18 months ago, kiwifruit and crop physiology more broadly was a new area for her. However, the modelling principles were familiar: identify the important processes, understand how they interact, describe them mathematically, and test the predictions against real observations.

Niloo works closely with scientists, growers, and engineers. These collaborations are an important part of model development. Discussions with experts help ensure that the model reflects both biological understanding and practical orchard considerations. Orchard visits have also helped connect the virtual representation of the crop with what is observed in the field. Niloo is currently focusing particularly on fruit quality prediction. While yield is a major component of orchard performance, fruit quality is central to commercial outcomes and grower returns.

Being able to predict quality attributes alongside crop growth and development would improve the ability to assess management strategies and understand potential trade-offs across a season.

Vine condition, carbohydrate reserves, previous crop load, and seasonal stresses can all influence future growth and production. A strong or difficult season does not simply end at harvest; it can affect the vine's capacity and performance in the following year.

Capturing these carry-over effects is one of the important aims of Niloo's modelling work and is a key step toward making crop predictions more realistic and useful.

Her typical day includes a mixture of coding, analysing data, reading scientific literature, comparing model outputs with orchard observations, and discussing model behaviour with collaborators. She uses tools such as Python and crop modelling platforms to build, test, and refine the model. Much of the work is iterative: predictions are compared with data, differences are investigated, assumptions are revisited, and the model is improved.

For Niloo, one of the most rewarding parts of crop modelling is identifying patterns in complex biological behaviour



Dr Niloofer Shahidi

and converting those patterns into algorithms. Kiwifruit development is influenced by many interacting factors, including temperature, management, vine history, and seasonal variability. Modelling provides a way to bring those factors together and explore how they may affect crop performance under different scenarios.

The longer-term goal of this work is to provide a modelling framework that can support the kiwifruit sector in assessing management strategies, understanding climate-related risks, and making more informed decisions. By combining data, field knowledge, biological understanding, and process-based modelling, Niloo's work aims to help researchers and industry partners ask practical questions about the crop and explore possible outcomes before decisions are made in the orchard. ■

Dr Niloofer Shahidi is a crop modeller, working within BSI on process-based modelling of kiwifruit growth, development, yield, and fruit quality.

Spotlight on our industry

Kiwifruit industry personalities and businesses making their mark



Kiwifruit crew heading to national young grower finals in Cromwell

William Kenna has won the Bay of Plenty 2026 Young Grower regional title.

Kenna is orchard and innovation lead at KWKiwi, at his family's kiwifruit business based near Katikati. He pitched his skills against seven fellow contestants to take the title on June 19.

He will now go on to compete against six other regional winners in the national Young Grower of the Year competition in Cromwell on August 27-28, including nursery manager Amelia Marsden, who won the Nelson Young Grower regional title for the second year running.

Marsden took third place in the 2025 national final and recently started work for Thomas Brothers Orchard in Riwaka.

"It's been a big month," she said. "I felt more pressure going into the regional final, having won last year but it was a great

day, we had beautiful weather. My fellow contestants were all of a very high calibre and there was a really good atmosphere.

"Thomas Brothers has a history of people getting to the national Young Grower final, so hopefully that will help my preparations for the national event."

Kenna, 29, earned a degree in marketing and logistics and worked in the wider fruit and vegetable market in Wellington before returning to the family business in 2020.

"I grew up learning about the business and really enjoy the opportunities for innovation and growing a great product which is healthy and enjoyed by consumers around the world," he says.

"The role is different every day.

"Depending on which hat I'm wearing, I'll be working on data and innovation or spending time out in the orchard working with the vines."



William Kenna

Runner up in the Bay of Plenty competition was Aimee Barker-Gilbert, who is external operations manager at Hume Pack-N-Cool in Katikati. Third place went to Patterson Kelly, an orchard manager with Trevelyan's Pack and Cool in Te Puke.

Kiwi company unveils new biostimulant

Dunedin-based company Botry-Zen has unveiled a new biostimulant, available for kiwifruit growers to use as a soil application, with further reviews on its usage to come later this year.

The new product Chito-Zen® has been released for sale, and could be used during dormancy, pre flowering, fruit set to harvest and post harvest.

The product is derived from Chitosan which in turn comes from chitin, found in the exoskeletons of crustaceans such as shrimp and crabs, and fungal cell walls.

It is widely used in pharmaceuticals, agriculture, and tissue engineering due

to its biocompatibility, antimicrobial properties, and ability to aid in drug delivery.

Botry-Zen general manager Peter Foster says the polymer has become increasingly popular with conventional and organic growers in Europe to promote stress resistance; as an elicitor of plant defence mechanisms; or to improve the efficacy of other applied products.

"European growers have been facing challenges due to changing regulations and product availability," he explained. "Chitosan products have filled some the gaps in some of the stages of plant development, especially where there have been environmental issues with some other products."



BOTRY-Zen was the first biological fungicide based on a living organism developed by Plant & Food Research, with the company of the same name established to produce high-performing, residue-free biological fungicides.

Kiwifruit biosecurity champion takes on bee role

Te Puke kiwifruit grower Simon Cook has taken on a new leadership role, recently becoming the new independent chair of New Zealand Bee Health and Biosecurity (NZBB).

Having recently vacated the top chair at Kiwifruit Vine Health, Cook will oversee the Trust tasked with helping beekeepers eliminate American foulbrood in New Zealand.

His motivation? Being right at Ground Zero during the Psa crisis prompted Cook to invest heavily in his knowledge of biosecurity. From his contracting business and family's third-generation orchard, he completed a Nuffield Scholarship in 2018, which saw him travelling the world to assess and report on biosecurity practices. More recently, he's led KVH, plus had directorships with Horticulture New Zealand and Trevelyan Growers.

"When I saw this role come up, given my background with KVH and everything else I've done in biosecurity, it was just a natural fit and I couldn't not apply for it," Cook says of his new role.

NZBB is the successor organisation to the former AFB Management Agency. Last year it was controversially moved into a Trust with the existing board taking up the role of trustees. Following a recruitment process run by an executive recruitment agency the existing trustees signed off on Cook's appointment, replacing

Christchurch non-commercial beekeeper and consultant Mark Dingle who had served six years in the top chair.

"Simon's application stood out due to its relevance and the working relationship between NZBB and the kiwifruit industry," says NZBB chief executive Niha Long.

"I have always said pollination is our biggest blind-spot, in terms of AFB control. So, with Simon's networking and connections within the kiwifruit industry it will certainly help us make some progress there."

While American foulbrood is the Trust's main focus, Cook has seen KVH go from a Psa-specific group to an organisation dedicated to a wider biosecurity role for kiwifruit over the past 15 years.

"There are other risks out there past AFB, and so the industry needs to be working towards protecting itself, not just from AFB, but from any other potential threat," Cook says.

Meanwhile, Paengaroa's Mānuka Orchard, the honey processing and marketing company owned by Logan and Tania Bowyer - hosted the recent North Island beekeeper's annual meeting, drawing participants from as far afield as Northland, Wellington, and even the South Island.

This year's theme was 'Project 2030', a vision for both the company and wider



Simon Cook

industry of ongoing development of both mānuka honey and kiwifruit pollination businesses.

Attendees were presented with the latest sector data and information about the industry from MPI and Zespri, as well as new pollination and honey research from scientists at the Bioeconomy Science Institute and the University of Waikato's Honey Research Unit.

More tangible, material advice and business support was on hand too, about breeding varroa-resistant bees, equipment supplies, bee health and nutrition, and biosecurity. New innovations in software and orchard crop scanning were on display, and garnered enough interest to prompt follow-up 'field days' in the coming weeks before the beekeeping and pollination season begins in earnest.

Patrick Dawkins - Apiarist's Advocate editor, and Dave Black - contributor.

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Industry profile | Carolyn Mortland

Carolyn Mortland is Zespri's Executive Officer – Sustainability. She is an experienced leader in strategy, sustainability and stakeholder relations and spent nearly 20 years with Fonterra, culminating in a role as Director Global Sustainability.

After several years as a consultant, her appointment at Zespri is something of a homecoming. She spent most of her formative years in Te Puna, with her parents Jane and Ian Mason, who established a kiwifruit orchard in the early days of the industry.

Q: Tell us about your early experiences in kiwifruit?

My parents were running a supermarket in Lower Hutt when they decided "there's something in these Chinese gooseberries". They packed their four kids into our Holden Kingswood and headed north. We bought Sherwood Orchard in 1978, eight hectares primarily in apples, which we progressively transitioned to kiwifruit.

Every May school holiday was a major in our household. Dad was head of operations, running the picking and packhouse, Mum was head of quality and the four of us kids were assigned various duties from packing (older sister), making up the trays and pallets (older brother) and spotting the wonky fruit (6-year-old me and my 4-year-old sister).

Q: Do you recognise anything in the industry now, from those early days?

I see a lot of similarities still. Life was buoyant – we were growing a great fruit, exporting it to the world and enabling a lifestyle of sunshine, good work and close communities. There were ups and downs, with one season being almost wiped out in a hailstorm, and the industry also faced significant challenges in the early 1990s. But that's what I still see today. A mix of entrepreneurial spirit, smart operators, family orientation and a collective industry memory of the bad times that inspires us to work harder for the good times.



Q: What has been your focus since joining Zespri?

We're focused on where we can have the most impact, financially for growers, environmentally and socially. That's why we've embedded sustainability within our 2035 strategy. We released a Climate Change Transition Plan at our Momentum conference in February 2026. It sets out the approach we're taking in aiming to reduce greenhouse gas emissions and

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build supply chain resilience as the industry navigates extreme weather events and a changing climate.

We're also continuing to invest in areas that matter to our customers and the long-term strength of the industry. This includes innovating for sustainable packaging, and building evidence around the environmental and social footprint of kiwifruit.

Q: What's the most exciting thing coming up at Zespri?

The launch of Grown for Good across Zespri's core markets globally during the 2026 New Zealand kiwifruit season. This reinforces our commitment to natural nutrition and is underpinned by how Zespri kiwifruit is grown with intention. This is a great platform to showcase the care with which we grow, pack, ship and sell our fruit to customers and consumers around the world.

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Community event boosts Katikati Foodbank coffers

The second-annual Hume Fun Run/Walk has raised more than \$1100 for the Katikati Foodbank, while providing the local community with a morning of fitness, fun and connection.

After the success of last year's inaugural event, organisers ramped things up this year, adding a new 10km run and walk option to its 5km offering.

Competitors were encouraged to dress in blue, and were treated to fresh finish-line kiwifruit and entertained by Hume's RSE Vanuatu String Band.

"Being able to host a free event for the community that has supported Hume for more than 40 years is something we're incredibly proud of," Hume interim chief executive Nav Singh said. "It was wonderful to see the community come together once again and see people of all ages and backgrounds enjoying an active morning together while also supporting the



Katikati Foodbank is what this event is all about."

Local businesses also came to the party - Harcourts sponsored the best-dressed competitors, Farmlands provided post-race sausages and Zespri supplied smoothie bikes and face painting. A lollies-in-the-jar competition was

organised by Fotheringham Contractors, Dobson Refrigeration had a Spin & Win competition and Eves Katikati Real Estate put on a Bar Hang & Win challenge. ■

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Industry veteran to keep chasing knowledge

Shane Max

After 24 years at Zespri, **Shane Max** is buying a new pair of Red Bands. He's taking on a new challenge - moving from leadership roles at Zespri into GroWise, a consultancy business he's established with former colleague, Sophie Merwe. This is a reflection on that journey.

I realise I have an incurable condition, *Actinidin Disorder*. Something Ainsley my wife and my family likely realised long before me. It's an overwhelming desire to improve the livelihoods of rural communities around the world through growing healthy, nutritious kiwifruit in an environmentally friendly manner.

My passion to do this through grower innovations and applied research and extension likely started in the 1980s. Back then, as a kiwifruit grower, productivity gains seemed the only way to become profitable, and science had a lot to offer. But it was hard work with a young family, and a career change was called for. This led to a decade of managing agricultural research centres in New Zealand and the United States. This experience reinforced the importance of undertaking research that is relevant to growers as well as the critical role of extension in ensuring its adoption. On being offered a role in the Zespri technical transfer team, I took on a new challenge, a role that as it turned out was well suited to my *Actinidin Disorder*.

The early years were challenging. Low Hayward returns and the unsuccessful initial commercialisation of Hort16A were followed by its low dry matter 'potato' period. The industry slowly recovered - but remained fragile.

I quickly learned that the passion I was inflicted with was also prevalent among New Zealand's innovative growers and scientists at Plant & Food Research. I was privileged to spend two years seconded to the Te Puke Research Centre to rebuild relationships and develop a greater



Shane Max and Sophie Merwe

awareness of the role of extension to scientists.

The late 2000s saw the industry having some good years. Extension programmes helped the rapid dissemination of validated new tools emerging from both scientific research and industry practice. Innovations such as cane girdling, stringing and improved pollination systems combined with the development of a strong cooperative culture, enabled the industry to progress rapidly. We introduced a multidisciplinary approach to develop and implement low-drift technology, which saw our social licence to operate budbreak

"Delivering the right knowledge, at the right time, to the right people, in the right way, by the right people - to ensure effective positive change."

The Shane Max theory of extension

sprays survive. The rural posties were satisfied they were no longer at risk. Cane girdling evolved to trunk girdling, allowing the industry to continue to increase its productivity and quality.

Our global supply bases were struggling as well. I was honoured to share my incurable

Actinidin Disorder internationally, as we developed extension teams in Asia and Europe.

This was just in time, as it turned out, as an incurable disease turned up first in Italy and then France and New Zealand - *Psa*.

Like the introduction of the Zespri Taste programme years earlier, this was a turning point for our industry. The challenge was massive but through strong leadership, the strong *Actinidin Disorder* in our science and extension staff - as well as our global growers - saw us survive and then thrive. Global extension team grower tours not only allowed direct knowledge sharing but built a strong global grower culture as well.

It wasn't all beer and skittles though. We should acknowledge we weren't able to make Green14 and Gold9 successful. And gold plantings in Spain, Portugal, Turkey, Australia and the United States never succeeded. It was a lesson in the level of support required to make production and quality work, when engaging in different environments and cultures.

A Boston Consulting Group review in 2019 identified the importance of extension capability in ensuring Zespri's successful growth plans and thus the Global Extension Team (GET) was formed. Its leadership was a privilege I was bestowed with. The pace of change was accelerating. ZGS needed more support, and a more structured approach



Shane Max first appeared in the Kiwifruit Journal in 1996, while managing the Fruit Crops Unit at Massey University. Over the years, he and his teams have been regular contributors.

to applied research and extension programmes, with greater input from grower and industry groups was required. Greater extension capability both for the global extension teams and industry technical staff was a focus.

I was fortunate to lead and infect an amazing young team in China. Together, we gained a much better understanding of Chinese kiwifruit varieties and growing practices across the various provinces. Little did I know this would lead to the team finding unauthorised Gold3

plantings, which in turn led to me being a witness in the subsequent prosecution in the New Zealand High Court.

Back in New Zealand, fruit quality and environmental research and extension programmes became of greater importance. Developing new ways of working to deal with industry growth, customer requirements, societal changes, information management and knowledge creation were needed.

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progress in the extension programmes as resources were drawn to supporting affected growers. Serious fruit quality issues resulted in industry leaders calling for the Global Extension Team to lead an improvement in harvest practices. The team efforts won various Zespri awards – one particularly memorable one was the team being recognised for the efforts in leading changes in picking practices and quality outcomes.

The decision to commercialise Red19 led to many frustrated growers (and consumers), as the variety didn't initially live up to expectations. This provided the opportunity for me to leave a legacy - demonstrating what a coordinated research and extension approach could achieve. Leading Zespri's science, technical and extension staff, engaging with scientists and chemical companies, working alongside committed growers, all of whom also appeared infected with *Actinidin Disorder*.

We swung into action. A rapid response programme of work was planned and implemented with outstanding success. By international standards it was nothing short of miraculous - ultimately delivering a successful turnaround in the performance and adoption of the Red19 variety.

So, as I leave Zespri and put on my new Red Bands, I hope there are enough people with passion and a collective mindset to carry on the cause. As a great industry leader and mentor once said to me, "Extension comes into its own in the hard times and times of crisis."



Working with a young team evaluating Chinese production was a career highlight.

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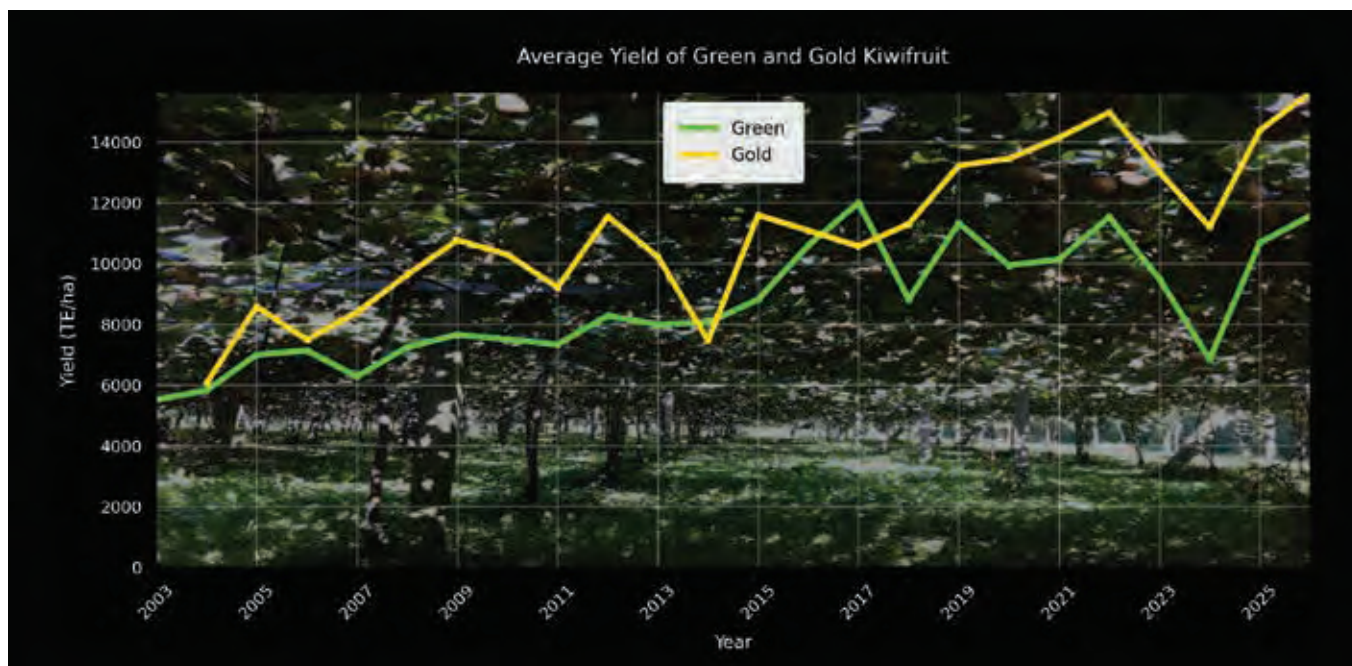
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The uncertainty of bees

What the changing face of NZ apiculture means for kiwifruit

Patrick Dawkins - *Apiarist's Advocate* editor

It's becoming increasingly harder for beekeepers to make the pollination business model work but it's hoped the formation of a new national body could help to focus change. Beekeeper and journalist **Patrick Dawkins** casts a wary eye over developments.



Commercial beekeeper representation in New Zealand is in a state of transition, with Apiculture New Zealand's (ApiNZ) most recent AGM in June seeing their members adopt a new constitution.

It moves the previously commercial beekeeper/hobby beekeeper/honey packer-controlled group to a commercial-beekeeper-centric organisation, named for now as Honey and Bees NZ.

On the surface, it seems beneficial for those industries that rely on commercial beekeeping operations to supply pollination beehives at scale – and there is no bigger in New Zealand than kiwifruit.

The wider context of the move, however, demonstrates uncertain times in beekeeping leadership in New Zealand, where short-term wins seem unlikely.

A year earlier at ApiNZ's 2025 annual meeting, a motion to dissolve the group was rejected when \$150,000 was donated by the Honey Industry Trust (a trust which backs industry research projects and education, primarily) to chart a new way forward.

"Unity" was the catch cry coming from that Christchurch meeting, and thus ApiNZ has worked closely with national-level commercial beekeepers group New Zealand Beekeeping Inc (NZBI) on a

constitution which will effectively allow ApiNZ and NZBI to come together.

Beekeepers were consulted with, and it was decided commercial beekeepers should take control of elected positions and voting membership, with non-commercial beekeepers, honey packers/marketers and other stakeholders invited to join with limited, "associate" status.

ApiNZ had been driven to the choice of 'dissolve or unite' largely due to years of falling membership incomes. New Zealand's registered hive numbers have fallen from close to a million in 2019 to 486,000 at latest count.

In that time, beekeeping businesses of 500 (approximately one labour unit) or more hives fell from 380 to current levels of 214. Honey pricing was the obvious driver in that contraction, with first non-mānuka and then mānuka prices falling off a cliff, before an uptick in 2026.

So Honey and Bees NZ has been born, and has just begun a membership drive. Will the new commercial-beekeeper-focused mandate draw in more members and more income? It is a big unknown but early budgets are modest, just \$140,000 in year one. That obviously won't go far, and adapting the constitution to better involve other stakeholders in such a small industry will surely be discussed before long.

Interestingly, MPI has been working behind the scenes to pull together something they have dubbed 'New Zealand Honey and Bee Alliance' which aims to put leaders from various sectors of the apiculture industry around the same table.

It is seemingly the ministry's way of creating a single touch-point for government with the full apiculture industry, in the face of Honey and Bees NZ's narrower focus.

From a kiwifruit grower's perspective, the moves need to be viewed with varying lenses for short and long term. Honey and Bees NZ won't be funding any significant bee health or pollination projects anytime soon. However, if it can draw in commercial beekeepers to the membership, it could become a valuable, collective, contact point for a key service provider to growers.

With unity the primary goal, Honey and Bees NZ might be seen as a small snowball at the top of a cold, snowy hill.

What momentum and size it can build is still the big unknown but, if it can get on a roll, a commodity levy on honey may be achievable years down the line.

That could be when the payoff for beekeepers and those relying on their services arrive, though there's an obvious flaw in this analogy.

Us beekeepers don't usually pray for snow. ■

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Petal persuasion

Why Red19 and Gold3 flowers are more attractive

Melissa Broussard - Bioeconomy Science Institute; **Shane Max** - Zespri

Just like humans, bees need a balanced diet, with everything in moderation. And that has obvious ramifications during kiwifruit pollination, especially when different varieties have different nutritional qualities.



Growers and beekeepers alike have noticed that it's easier to find more bee activity on Gold3 and Red19 flowers than on Hayward. This has fuelled the debate on why and what it might mean for both bees and pollination.

To address one part of this question, Bioeconomy Science Institute (BSI) and Zespri investigated the nutritional quality of pollen from each of these cultivars and their pollenisers, finding substantial nutritional differences between cultivars.

Kiwifruit pollen provides essential amino acids rare in the environment, as well as essential omega-3 fatty acids, but has a

very high protein-to-lipid ratio. In future, it may be possible to formulate a nutritional supplement for bees to help maintain colony health while pollinating kiwifruit.

Bees can detect the nutritional quality of floral resources, and balance their foraging to include essential amino acids, and a target ratio of amino acids to fatty acids. As kiwifruit produces a negligible amount of nectar, it is possible that bees are detecting a difference in the quality of pollen between cultivars.

To find out, an exploratory research project was undertaken by BSI with funding from the Kiwifruit Royalty Investment Fund

(KRIP) and Zespri. This lab-based work assessed the nutritional quality of pollen from Hayward, Gold3 and Red19 and their respective male pollenisers (Chieftain, M91, and Russell).

Pollen from each cultivar was analysed for its amino acid and fatty acid composition. The make-up of these and their ratios were compared with those of common pollen sources from a range of plant families.

Male pollen contained around seven times more amino acids than female "pseudo pollen". It also contained much higher amounts of essential fatty acids.

Ratios are important

Across all cultivars, kiwifruit pollen was found to be relatively rich in protein, particularly important amino acids like leucine and isoleucine. These are essential for bee development and brood rearing, and are often limited in other plants.

While this is good news, there is a catch. The ratio between protein and fat is not ideal in kiwifruit pollen (Figure 1).

Bees require a balanced diet, and recent research suggests the protein-to-lipid ratio is one of the most important drivers of bee health and feeding behaviour (Lau et al 2025).

In the lab, nurse bees have been shown to stop feeding when they hit either their protein or their lipid requirement, meaning they will eat less of any unbalanced food sources, even when given no other options.

From a bee's perspective, this makes male pollen a more balanced dietary choice, with Hayward - and its extremely high proportion of protein - being the least balanced choice. Previous work has shown that bees do not distinguish between male and female flowers when out foraging in Gold3, unlike in Hayward, in which bees prefer one sex over the other in choice tests, and this may be one reason why.

Fatty acids play a critical role in bee health, including for energy supply, immune function, and resilience to stress. Linolenic acid (omega-3) was found to be quite high in male kiwifruit pollen, comprising over

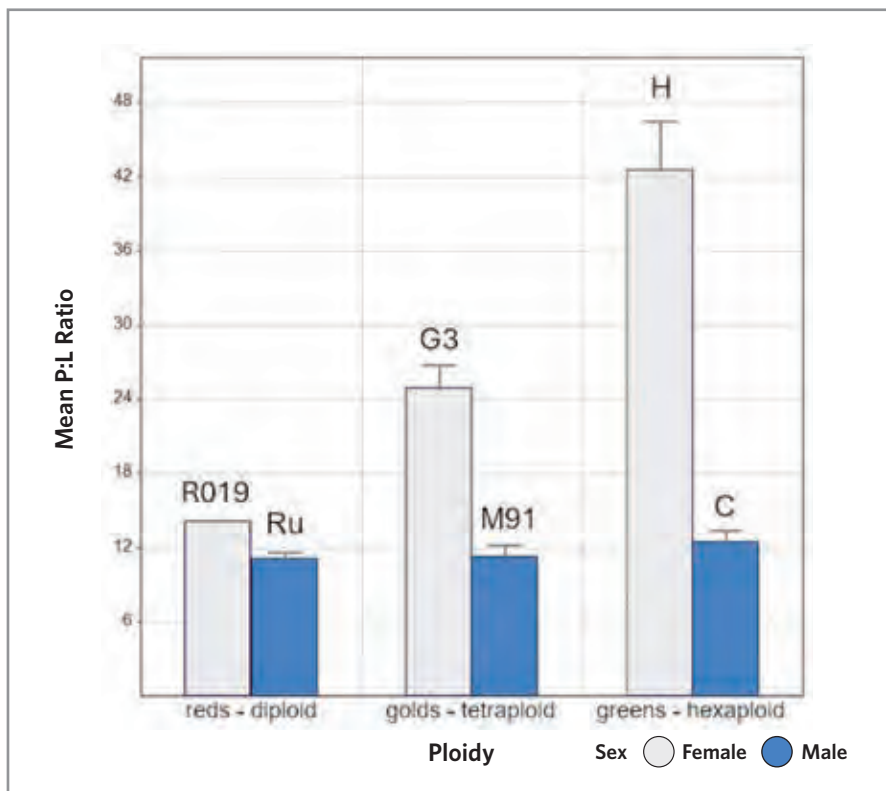


Figure 1. Bar plot showing mean ratio of protein (P) to lipid (L) for each kiwifruit cultivar, where P is defined as total amino acid content ($\mu\text{g}/\text{mg}$) and L as total extractable fatty acid content ($\mu\text{g}/\text{mg}$). Measures of variance are given as standard deviations (SD) of the mean. Cultivars tested were: males: Chieftain (C), M91, Russell (Ru), and females: Gold3 (G3), Hayward (H) and Red19 (R019). Cultivars are grouped by ploidy, with higher ploidy flowers in general being larger and having more pollen per flower.

40 percent of all lipids. Linolenic acid is an essential fatty acid for bees just as it is for humans, and bees require a balanced ratio between omega-3 and omega-6 fatty acids. However, while omega-6 fatty acids are common in plant pollens, including

those of weedy species, omega-3 is rare. This means kiwifruit could be a valuable contribution to bees' diets.

However, if bees were to have access to only kiwifruit pollen, the high amount

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of omega-3 fatty acids can also cause problems, just as high omega-6 can. This imbalance can affect:

- Bee learning and navigation
- Brood development
- Lifespan and colony strength.

In simple terms, bees feeding only on kiwifruit pollen do not receive everything they need nutritionally, and if restricted to just kiwifruit pollen, it can lead to:

- Reduced bee health
- Lower brood rearing
- Reduced pollination performance.

What can we do?

Are there implications for orchard hive management in these findings? The results support the widely held belief that the sterile female pollen of Hayward is a poor food source for bees, but Gold3 and Red19 pollen have more favourable ratios between proteins and lipids, with Red19 pollen possibly being similar to the attractive male pollen.





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However, this work makes it abundantly clear that kiwifruit alone can't sustain bees - they require access to other sources of nutrition to maintain colony health. Growers should promptly notify their beekeeper once flowering is completed, to enable quick removal of bees to sites with greater floral diversity, which would help to minimise any negative impacts.

In high intensity situations, especially when hives are likely to be in the orchard for longer periods, beekeepers should consider targeted bee feeding (including the essential amino acids missing in kiwifruit and a high proportion of fatty acids) to support colony performance. When hives are being re-used between Gold3 and Hayward, beekeepers should avoid moving them directly from one orchard to another.

A recovery period in a location with floral diversity will allow a broader array of pollen collection, providing a more nutritious diet, and thus healthier bees.

Poorly designed hail-netted blocks are known to weaken hives considerably

through the loss of foraging bees, which ultimately affects the brood.

Allowing foraging bees to have access to greater nutritional diversity may help them to balance the amino acid to fatty acid ratio in their diet.

Ways to do this are:

- Ensuring hives are placed either under a gap in the hail netting or outside the hail net;
- Encouraging some flowers in the orchard sward (particularly those with high-fat pollen, such as daisies and dandelions);
- Providing them with a nutritional supplement tailored specifically to balance nutrients lacking in kiwifruit pollen.

Filling the nutritional gaps in kiwifruit pollen could allow for greater colony health and re-use between Red19, Gold3, and Hayward, a good outcome for both beekeepers and orchardists.

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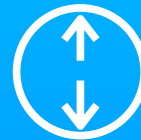
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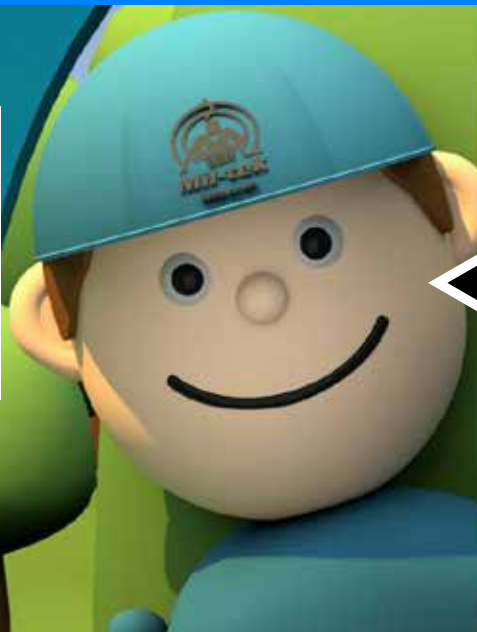
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The seeds of pollination success

How much Hayward are you leaving on the table?

Shane Max, Julia O'Brien, Dermott Sweeney - Zespri

Pollination assessments across a range of Bay of Plenty Hayward orchards indicated most did not achieve full pollination in spring 2025. Both fruit size and flower to fruit conversion were compromised. No single factor was considered responsible; a consequence of the complexity of the factors that influence pollination.

Pollination assessments have been shown to be a very effective way to show how well an orchard pollination system is delivering to its potential. Zespri's Orchard Research and Trials (ORT) team (formerly the Global extension team) undertook assessments across a range of orchards in Eastern and Western Bay of Plenty last spring. Coupled with the pollination assessment, information was gathered on various orchard, environmental and management factors, along with orchard observations to determine where gaps in practices or knowledge were present.

This project complemented previous work done in the ORT's Hayward productivity workstream, which emphasised the role that good Psa control, including Ambitious®, and foliar tech urea applications, can play in lifting productivity.

The exercise involved 15 Bay of Plenty orchards located from Whakatāne to Katikati. The objective was to gain a better understanding of whether pollination practices were limiting yields in Hayward orchards. Sets of paired, recently opened flowers were tagged - one pollinated with male flowers from nearby vines, the other left untreated and therefore reliant on bee or supplemental pollination (see Zespri Canopy for methodology).

Assessment was completed once in each orchard, typically when around 70 percent of flowers were open. Flowers were typically located as the furthest distance from the male, therefore caution is advised in extrapolating results to



Bee counts were taken at the time the hand pollination was conducted.

orchard total yield levels. Information and observations on orchard environment and management practices were captured on a range of factors. These included:

- Male type and layout;
- Stage of flowering;
- Visual estimation of crop load;
- Hive numbers and bee activity;

- Supplemental pollination practices;
- Psa presence.

Before commercial harvest began, tagged fruit were collected, weighed and assessed for Class 1 grade. Missing fruit was assumed to have not set or to have been thinned off.

Crop load was assessed visually and there

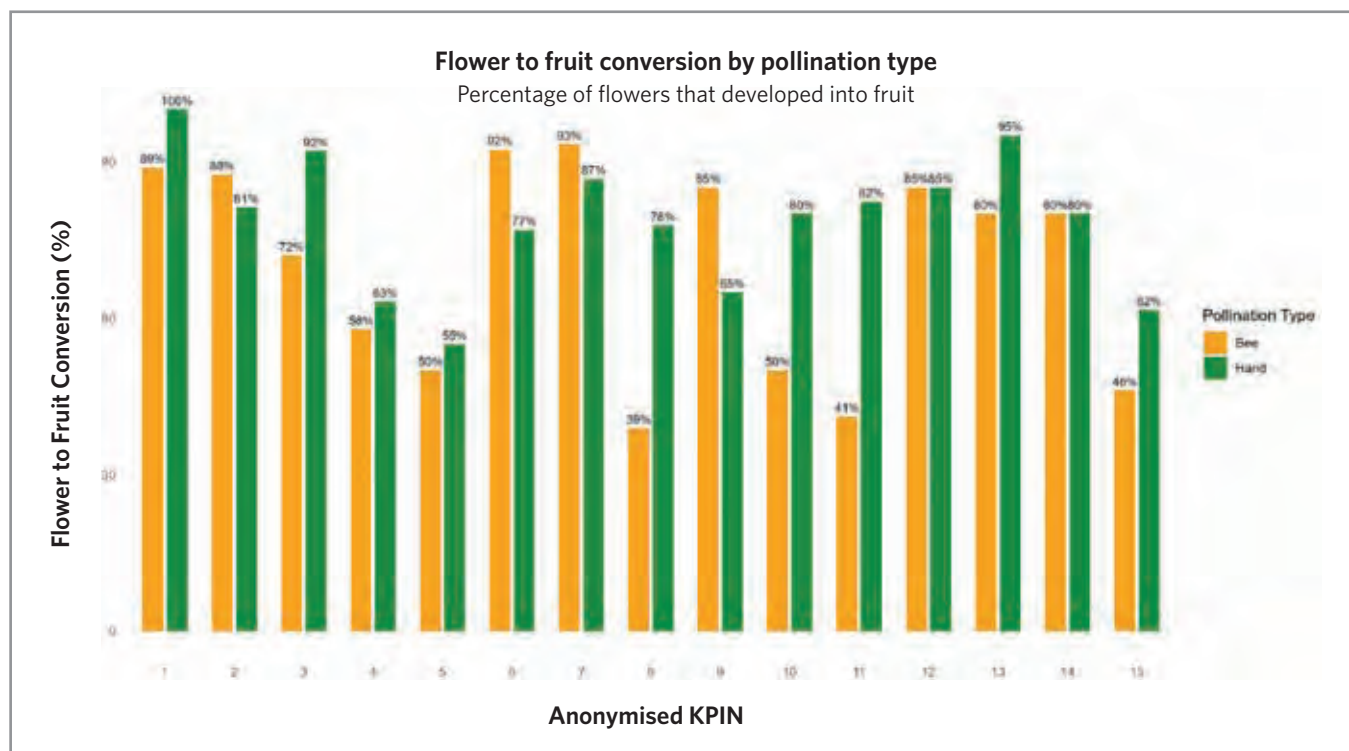


Figure 1. Flower to fruit conversion between hand and bee pollinated fruit made in 15 Bay of Plenty orchards.

was a mix of light, moderate and heavy crop loads. Male layout included east-west strip male. Bee activity at the hive was visually assessed and bee counts in the orchard undertaken at the time hand pollination occurred. This was typically in the morning when vines were dry or dryish, apart from days with recent rain.

The weather over the pollination period when assessments occurred was reasonable: there were some rain showers

and temperatures ranged in the mid-teens to low twenties, with weather suitable for bee foraging occurring most days.

Pollination outcomes varied widely between orchards indicating that pollination effectiveness is highly system-dependent, with some orchards already near optimal levels and others significantly constrained.

Across the 15 orchards, hand pollinated fruit were, on average, 7 grams heavier

averaging 122g versus 115g compared to grower practice.

However, more than half of the orchards showed little difference in fruit weight (3g or less) while a few had much larger differences (up to 22g) (see Figure 2).

Somewhat unexpected was the range in the flower to fruit conversion. This ranged between 39 percent to 100 percent across both hand-pollinated and grower practice. Looking back at

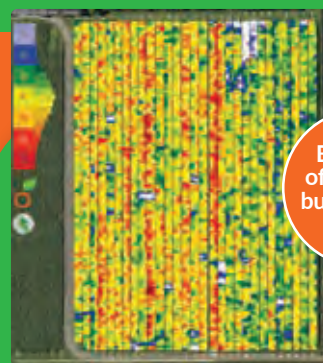
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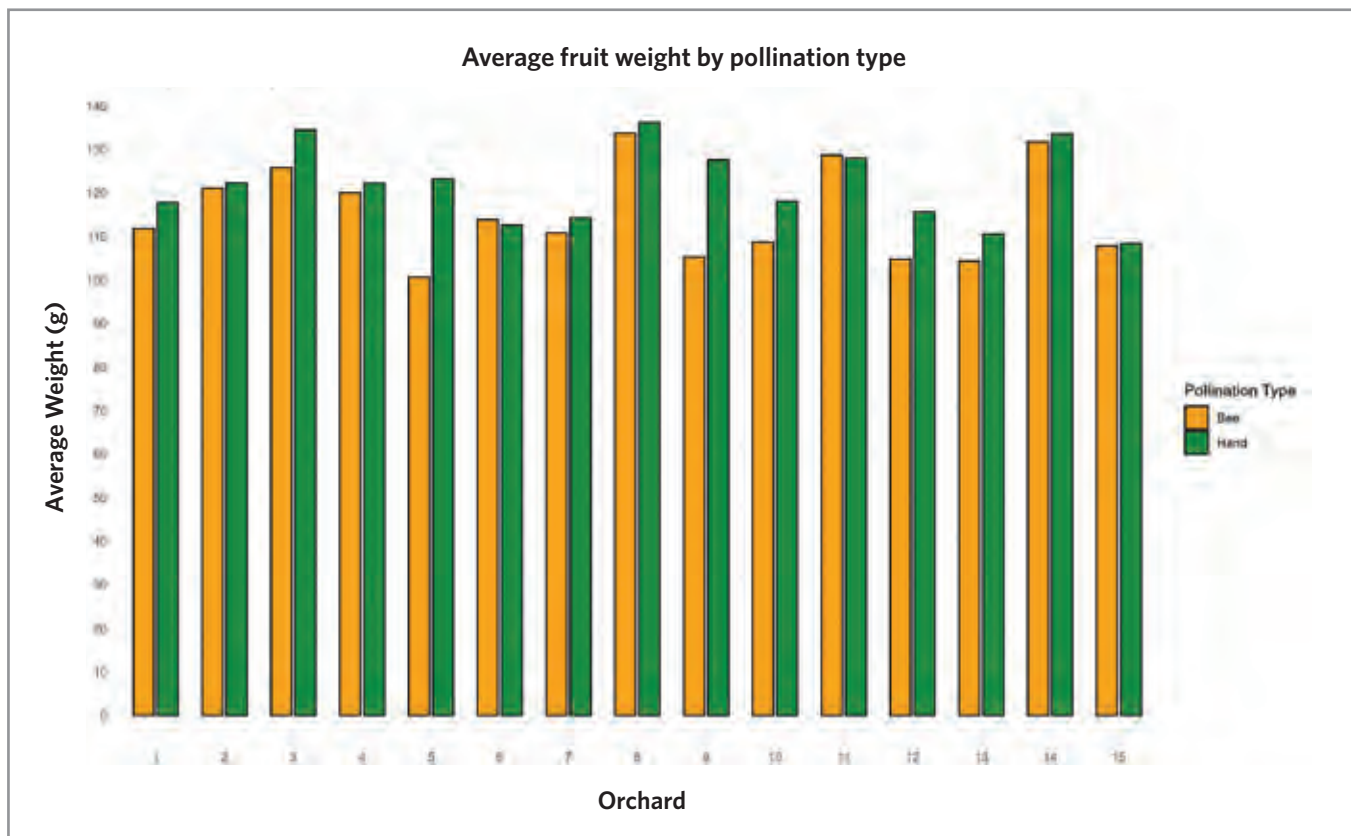


Figure 2. Fruit size difference between hand and bee pollinated fruit made in 15 Bay of Plenty orchards.



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Fruit from the pollination trial were harvested, weighed and assessed against Class 1 standard.

a similar exercise conducted with the Focus Orchard Network (FON) more than 15 years ago, before Psa, flower to fruit conversion of more than 90 percent was common. The factors contributing to the variability observed this year are difficult to determine. However, several influences, including bee activity, weather conditions, Psa, and thinning practices, are likely to have contributed.

A smaller scale exercise undertaken last season by the BioEconomy Institute found 25 percent of covered Gold3 orchards experienced sub optimal pollination,

resulting in smaller fruit and lower dry matter (*M. Broussand pers. Comm*).

While a substantial amount of data was collected to investigate correlations between orchard factors affecting fruit size and flower to fruit conversion, the sample of 15 Hayward orchards was insufficient to draw any strong conclusions, especially given the variety of factors known to influence pollination. That said, the strong performance of the top four orchards suggests that achieving good fruit size and flower-to-fruit conversion is primarily a function of system design and conditions,

rather than simply increasing inputs.

On all four orchards the assessments occurred between 75-95 percent of flowers open. Chieftain was the only male recorded. Three quarters of the orchards were in Western Bay of Plenty, where competition from clover in pasture is lower.

All crop loads were considered light to moderate indicating relatively low pollination pressure. Only two of the four orchards had received supplemental pollination, either one wet or one dry application at 250g/ha.

This indicates that with good male layout, under good weather conditions with good bee activity, supplementary pollination is not a necessity. No obvious Psa was observed in any of these four orchards.

Pollination assessments provide a quick, low-cost and reliable way to assess an orchard's pollination system. It is recommended that assessments are undertaken multiple times throughout the flowering period - early, mid, and late - to better understand bee activity over the whole flowering period.

Observations across many orchards during pollination also highlighted several sub-optimal practices. Some growers and managers were unaware of low bee activity that could have been a result of substandard hives.

What this shows

Consistently strong bee activity throughout flowering is essential to maximise yields and "leave nothing on the table".

This requires strong hives that are regularly fed sugar syrup. Decision makers should be prepared to pay for quality hives, have them audited and avoid sourcing hives that have come directly from netted orchards.

Applying dry pollen when there is no bee activity likely, or applying dry pollen under damp conditions provides very little benefit. Dry pollen easily explodes upon exposure to water and to be fully effective, requires bees to transfer it to flower stigmas. Similarly, boom application of wet pollen at low rates is largely ineffective, as little pollen reaches the stigmas, and bees cannot redistribute wet pollen. So, where there is little bee activity, wet pollen application with targeted flower devices (rather than boom spraying) is a more effective tool.

Acknowledgments

The authors wish to thank the growers who provided their orchards for this project. ■

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Measuring bee losses

Pike Stahlmann-Brown - Bioeconomy Science Institute

Since 2015, the NZ Colony Loss Survey has been conducted each year by scientists at the Bioeconomy Science Institute Maiangi Taiao, on behalf of the beekeeping industry and the Ministry for Primary Industries (MPI).



The survey aims to provide feedback so that New Zealand beekeepers can compare their experiences with national and international information, as well as exploring potential causes of losses and ways to prevent them. It also provides an evidence base with accurate facts and data to inform industry and government, and form a framework for building a long term picture of annual or seasonal trends in colony losses.

Results of the 2025 survey have recently been released, and these show an increase in varroa problems underpinning higher bee colony loss rates in New Zealand.

Last year, 1948 beekeepers were surveyed, who collectively had 148,460 colonies.

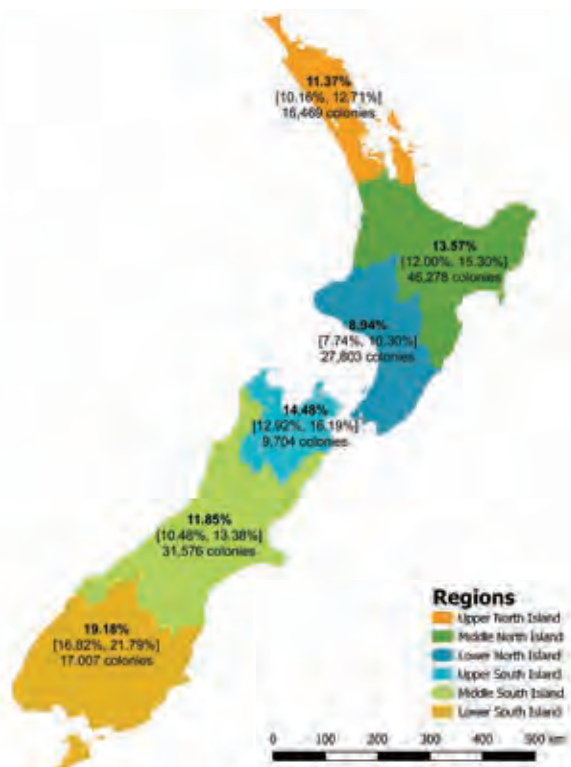
It is estimated that 12.8 percent of New Zealand's colonies were lost in New Zealand during winter 2025. This means 63,435 colonies died over winter 2025, from a total of 495,587. This higher loss rate reverses recent trends of declining colony loss rates, although colony loss rates remain below their 2021 peak. As with the previous winter, loss rates over winter 2025 were highest in the lower South Island.

Commercial beekeepers (50+ colonies) represent about 10 percent of all registered beekeepers and manage about 95 percent of all registered colonies. Hobbyist beekeepers (1-49 colonies) represent 77 percent of all registered beekeepers and manage 5 percent of all registered

colonies. About 13 percent of registered beekeepers do not currently keep bees.

Higher winter losses in 2025 were driven largely by varroa, which was estimated to have caused the loss of 7.0 percent of all healthy, living colonies (up from 4.6 percent in winter 2024). Losses differed notably by beekeeper type: commercial operations reported losing 6.9 percent of colonies to varroa, while hobbyist beekeepers lost 8.7 percent - a striking 26 percent higher rate. Several factors may explain this gap. Compared with commercial beekeepers, hobbyists were more likely not to treat for varroa between spring 2024 and winter 2025 (0.6 percent vs 0 percent), to treat only once during this period (22 percent v 6 percent), or to rely

Estimated Winter colony losses, by region



on a single treatment type (31 percent v 13 percent).

Varroa mites are external parasites that infest both adult honey bees and developing brood, weakening individuals and, in severe cases, leading to colony death. In 2025, losses attributed to varroa reached their highest level since this survey began, with beekeepers identifying varroa and related complications as responsible for an estimated 7 percent of winter colony deaths among previously healthy hives. Varroa accounted for more losses than queen problems, suspected starvation, wasps, and all other causes combined, with particularly high impacts reported in the lower South Island.

The survey always includes 'special topics' as well as the core questions on overwinter losses and varroa management. One of the special topics in 2025 was about whether beekeepers control wasps. If they did, the survey further asked how they control wasps and how many wasp nests they think they killed.

Survey results show that 49 percent of beekeepers control wasps. Among those who controlled wasps, about half used traps, 41 percent directly killed wasp nests, and 33 percent indirectly killed wasp nests. In total, the survey results suggest that New Zealand beekeepers killed 12,200 wasp nests over the past year, an enormous (and often uncredited) public service.

This work was funded by Biosecurity New Zealand. ■

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Maintaining hive strength pollinating kiwifruit

Shane Max - Zespri

The pressures on pollination in the kiwifruit industry continue to grow, with more hectares of fruit added each year and management practices like covered orchards that aren't always conducive to bee health. So what can growers do to maintain hive vigour and wellbeing?



The kiwifruit industry continues to increase its hectares of new plantings. Gold3 licences continued to be issued at around 400 hectares per year and Zespri has recently commercialised 100ha of another Red variety, Red80, which flowers at a similar time to Gold3.

New plantings are occurring across New Zealand but predominantly in the wider Bay of Plenty, where 80 percent of kiwifruit production is based. Increased hectares means increased demand for pollination hives, where stocking rates are typically 8-10 hive per hectare.

High licence costs (\$684,000/ha for Gold3 in 2026) and the sensitivity of new cultivars to wind means most new developments and some older plantings are utilising overhead hail netting and artificial shelter. This allows orchards to develop quickly and increases Class 1 yields.

Early on, we recognised the use of hail netting was impacting hive strength. Plant & Food Research (now Bioeconomy Science Institute) has researched this heavily, funded by Zespri and the Ministry of Primary Industries.

Growers and orchard developers have also initiated new practices and assessed their impact. Trial results have helped to understand and to develop mitigation strategies. It is in the interests of growers and beekeepers alike to implement these. For growers, reduced bee numbers result in sub-optimal pollination, reducing fruit size and yields and lowering fruit dry matter, a key quality metric.

The research provided a much better understanding of how bees and brood are affected by hail net and while this has been communicated to growers, elements of poor practice still occur. This results



Bee hives need holes in hail netting and the canopy to improve bees navigation.

in deteriorating hive strength, frustrating beekeepers and sub-optimal pollination for growers. This article outlines what we currently understand good practices to be.

When beekeepers are negotiating arrangements with growers, orchardists need to be fully aware of how hive deterioration can be mitigated. And we also want to help educate new growers and managers on the benefits of implementing good practice.

Covered orchards

The installation of covered structures has been shown to interfere with the bee navigation systems and can prevent them returning to their hive. Having only a hail-netted roof with no sides, or rolled up sides over pollination, has been shown to minimise bee losses. Close woven weaves used for wind break on the sides are troublesome, hence making them able to roll up or eliminating them completely is required.

Hive placement

Placing hives on the perimeter of the block outside the hail netting has also been shown to help foraging bees return to their hive. Initial research indicated placing hives under holes in the canopy where they were exposed to blue sky was also beneficial. More recent experiences have shown that if hives are placed under large holes in the hail netting or better still, when a complete strip of hail netting is removed (or never installed), little impact of hive

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strength occurs. Simply, if the bees leaving the hives are exposed to plenty of clear sky, navigation issues and thus bee losses are minimised. The complete removal of strips from overhead netting has been shown not to adversely increase the levels of wind in the block. (Although it is likely to result in increased water needs of the vines directly under the hole due to increased evapotranspiration).

Colony size

Without ideal structural construction, scientists found that small or nucleus colonies (less than six frames of bees) and moderately-sized colonies (7-10 frames of bees) lose proportionately fewer bees than large colonies (11-19 frames of bees). When comparing the change in colony strength coming out of flowering, large colonies lost twice as many bees as moderate-sized colonies on average, and eight times more bees than small colonies.

Why smaller colonies lose less is likely due to larger colonies having a greater proportion of the bees out foraging, and/or bees foraging further away. In both these cases, there would be an increased likelihood of these bees becoming lost.

When appropriately stocked, small-to-moderate colonies can fully pollinate Gold3 but some challenges still need to be overcome. Stocking orchards with more smaller hives obviously come with additional logistical issues. To ensure there are an adequate number of bees in all parts of the orchard, a sufficient number of small/moderate colonies will

Anecdotal evidence suggests bees holes are more likely to be effective when sides are rolled up.

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need to be used and they may need to be spread around more widely than standard colonies. Research and observation indicate hives placed under canopy effectively pollinate flowers in the range of 50-100m from their hive. As covered orchards get larger, hive placement becomes more complex.

Hive rotation

Limiting the number of days colonies spend under covers will reduce bee losses. Rotating hives after several days in enclosed blocks has been shown to reduce bee losses in other crops. In one kiwifruit trial, it showed on average hives lost 2.3 percent of their frames of bees with every additional day under cover.

Following these projections, rotating hives out after several days can keep bee losses to 10 percent or less. However, used in isolation, this approach will not negate bee losses.

Large colonies can lose high percentages of their bees even when they are in the orchard for only a few days. The research also indicated the stronger the hive, the greater the percentage loss of bees.

If flowering is prolonged, flowering can last up to ten days while, under ideal conditions, most flowers will be open in 4-5 days. Previous research in Hayward orchards showed pollen collection rates were very low in day one and peaked over the following several days. The concept of rotating hives should be discussed with

the growers to ensure full pollination is achieved.

Hive stocking rate

The ideal stocking rate for Gold3 varies depending on the situation. Good hive practice is to split drops if flowering is prolonged and placing hives on the perimeter of a netted block, not under cover, to help mitigate bee losses.

It's essential that maximum bee numbers are foraging at full bloom. Ten industry standard hives per hectare is a common stocking rate, considered sufficient for most seasons if hives meet the industry standard. While flower numbers are higher than Hayward, bees work Gold3 much more strongly and don't orientate strongly to either males or female flowers like in Hayward.

Like Red19 flowers, however, Gold3 flowers are only fully receptive to male pollen for several days. If wet weather occurs over flowering, strong bee activity is required, once the fine weather arrives for to pollinate those flowers that opened over the rainy days. Supplemental pollination is also used where weather, bee activity or male synchronisation is problematic.

While growers typically provide water sources for bees in their orchards, bees under hail netting need more, owing to the warmer microclimate and increased difficulty in navigating. Bees appear to be more attracted to buckets of water placed outside the canopy in a sunny spot

- remembering to place floating objects or cloth into containers so that bees can access water without drowning.

Previous research also indicated techniques such as placing navigation aids or feeding pollen supplements were doing little to reduce bee losses, although pollen supplements were shown to reduce the loss of brood.

To mow or not to mow?

There is still some debate around the age-old practice of mowing the sward before beehives arrive. This practice originated when orchards were all Hayward. The arrival of Psa and the need to use antibiotics sprays close to flowering (albeit not so common now) saw mowing become a mandatory practice before application. Given that having a diversity of pollen source is good for hive health, minimising mowing and allowing ground cover species to flower in covered blocks may be sensible as it has other benefits for the orchardists.

Investment in research has allowed a much greater understanding of how covered orchards affect bees and what practices can be used to mitigate this for the benefit of the bees and the kiwifruit crops. It's frustrating that both industries still experience sub-optimal outcomes at times. Open, frank, well-informed dialogue is essential to addressing the issues, to achieve a win-win scenario. ■

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The importance of audits

Dave Black

The pressures on pollination in the kiwifruit industry continue to grow, with more hectares of fruit added each year and management practices like covered orchards that aren't always conducive to bee health. So what can growers do to maintain hive vigour and wellbeing?

What is 'pollination'?

Pollen is a name, a noun, from old languages like Latin, Greek, and Sanskrit for the fine dust or 'flour' that's made by grinding seeds, and that's what plant pollen looks like. In English, we turn that noun into an action by adding a Latin suffix, -ate, so we have the verb 'pollinate', meaning that flower 'dust' is acting on another flower. In a kiwifruit orchard people, machines, or managed bees are used to try and make sure this 'action' occurs reliably every time.



Fruit quality is the product of many interdependent factors; vine health, crop load, storage conditions, and so on, all of which can be managed to a greater or lesser extent. Pollination seems, like the weather, firmly in the latter camp - in the lap of the Gods. It needn't be like that. A methodical, planned approach to pollinating the crop starts early and needs to be kept 'on track' every season. In the mid-1980s, New Zealand developed one of the most sophisticated pollination systems in the world for kiwifruit, incorporating scientific standards for quality and best-practice auditing methods. It's time we remembered what that was all about.

Purpose of audits

Why would we want to audit pollination? The short answer is that money depends on it. Adequate pollination ensures that the money spent on growing great fruit produces as much as possible; pollination is part of the cost of growing, so are audits.

Pollination, whether it's provided by managed animals or by machinery, is supplied as a service by people with specialised knowledge. Buyers purchasing anything, from food or cars to children's toys and employees, rely on quality systems of some kind that try and ensure

they will get what they pay for. An audit of the pollination system is the only way the grower has to be sure their 'goods' are delivered 'in-spec'.

Importance of independence

To be fair to both grower and supplier, it's better that the examination is carried out by a professional intermediary who enjoys the confidence of both. Prompt auditing can provide an opportunity to rectify inadvertent quality defects and inform improvements or refinements to the service provided, provided there is appropriate record keeping and reporting.

Auditing protects both parties to the service. If the quality of the hives or pollen being supplied remains unknown, the supplier can be accused of not providing value for money, even of fraud. The supplier could lose the chance of repeat business, and is easily 'undercut' by a competitor more persuasively promising better quality at a lower cost. Without an audit, who's to know?

Auditing provides confidence that the specification agreed for the price was met, and that confidence is one part of the relationship 'glue' that binds supplier and grower. Growers want to know that the entity they are dealing with is capable and reliable, and they want to know that the product or service they pay for will produce the outcome they are planning on.

Methods for auditing

There are many ways to carry out a pollination audit and, as with nature, none of them are perfect. We can usually only assess the outcome or the activity. In an ideal world, a competent and experienced auditor would be familiar with all the



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On-orchard assessment	Target	Difficulty	Accuracy	Utility	View
Assessing fruit set	Fruit	Requires a methodical approach, but simple	Not as good as the packhouse sizer's data!	Seasonal, 'after-the-fact' indication of variability. Useful for maturity area revision	Retrospective
Seed counts	Fruit	Laborious, best for laboratories	Accurate for the sample observed but relevance a question of scale	Diagnostic but seasonal information, of under-pollination rather than over-pollination	Retrospective
Hand pollination control	Fruit	Requires a methodical approach and practice	Highlights areas for remedial work but hard to scale to the whole orchard	Seasonal, useful after changes in process, maturity areas, etc.	Retrospective
Counting bees	Bees	Easy, but needs careful, repeated observations	Indicative, but veracity dependent on timing and orchard conditions, and effective 'forager counts', highly speculative	Contemporaneous 'on-the-spot' gauge of activity that can anticipate problems	Prospective
Hive inspections	Bee colony	Requires training and experience	Predictive, relevant but largely subjective measure	Timely appraisal of capability and consideration of remedial action	Prospective

Figure 1. Summarising on-orchard pollination assessment methods for kiwifruit.

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possible approaches and be able to apply any of the various methods to any crop. These are described in detail on Zespri's Canopy site and are summarised in *Figure 1*. Avocado and pip-fruit growers have similar requirements.

Audits can be used while monitoring hive development in the period leading into pollination; a 'progress report', if you like. Audits should look at pollen extraction and storage for artificial pollination systems too, whether used with bees or not. Although we frequently think of audits as the 'ambulance at the bottom...', audits are just part of a functioning quality system.

Inspection techniques

Beehives can be inspected by an expert, although with some disturbance to the bees, using a process known as the Liebfeld Method, or some variation of it. All the hives can be opened and the frames of bees, brood and empty comb are counted and the area occupied estimated frame-by-frame.

In an orchard, faced with several apiaries worth of hives and a time limit, carefully checking a random sample is currently the best method, and such sample-checking is a foundational part of most quality-control systems. In Australia, and in California's almond orchards, the process has been

simplified to limit hive disturbance and make it more practical. Work is underway to augment inspection with photography to try and make the analysis more systematic and repeatable, which might ultimately enable computer-aided machine-learning techniques ('AI!').

There have been methods proposed for non-invasive hive checks that might be more suitable for dealing with the scale at which hives are deployed. Listening to hives (using small sensors and bees foraging) has been proposed, but the link between the acoustic properties detected and what they mean for the potential foraging population is uncertain. Populated beehives are warm and thermal imaging techniques might also allow us to judge the size or health of the colony but it's tricky. The heat a colony produces is proportional to the size of its brood nest, but also to how active it is, and beehive boxes can have wildly different thermal properties. The imaging is not yet (and may never be) 'fine-grained' enough to really see that a hive meets a required specification, and for now only suitable for a live/dead triage. Anticipating a brighter future is one thing, but let's not forget the tried and tested. Quality is the result of a continuous process, not technology. ■

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Getting pollination right

Reece Unwin - Kiwi Pollen

Supplementary pollination can help with greater fruit set, higher yields, higher dry matter, and increased seed numbers per fruit but there are some key things to remember.



Kiwi Pollen project engineer Matt Davoren servicing an ATV-Mounted PollenAid® wet sprayer.

How should I store my pollen?

Long-term storage

Pollen is a biologically active product, and how it's stored has a direct impact on its performance at pollination.

Once received, pollen should remain in an airtight, food-grade container and stored in a freezer at around -12degC (typical domestic freezer temperature). Keeping moisture out is critical, humidity is one of the main causes of pollen losing viability during storage.

When stored correctly under dry, frozen

conditions, pollen can retain good viability for at least 10 years. Poor storage, on the other hand, can quickly reduce its effectiveness.

Pre-application handling

How pollen is handled before use is just as important as how it's stored long term. Frozen pollen should be thawed slowly. The best approach is to move it into a refrigerator (4-6degC) for up to 24 hours, then allow it to come up to 10-20degC in the hour before use.

Avoid rapid warming. Taking pollen straight from the freezer into warm conditions, such as leaving it in the sun or in a vehicle, can cause condensation to form inside the

container. Moisture at this stage is a common cause of viability loss in the field.

Bringing pollen up to temperature gradually helps avoid condensation and reduces the risk of viability loss before application. The main thing is to keep it out of warm, fluctuating conditions until you're ready to use it.

How do I design a pollination trial on my orchard?

Many growers understand the fundamentals of kiwifruit pollination. However, how those fundamentals play



Pollen stored in sealed containers under frozen conditions.

out in the real world can vary widely from orchard to orchard. Factors such as microclimate, canopy structure, vine vigour, male plant distribution and bee activity all influence the final result.

Running a simple trial on your own orchard is one of the best ways to see whether a change in pollination practice is actually delivering value. It can help show how differences in application rates, timing, or method impacts your pollination.

A key requirement for any trial is isolation. To get meaningful results, you need to be confident that any difference you see is due to the pollination treatment, not other variables. Trial and control areas should be as similar as possible. Match blocks for cultivar, vine age, canopy structure and past performance wherever you can.

Keep the trial simple. Introduce one change only, such as pollen application rate, application method or timing. Irrigation, nutrition and pest management should be consistent across both the trial and control blocks.

Good data collection is essential.

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Kiwi Pollen's commercial manager Reece Unwin.

What should I do if bad weather hits during flowering?

Bad weather during flowering is one of the biggest risks to successful pollination. Rain, wind and low temperatures can all limit both natural bee activity and the effectiveness of dry supplementary pollination.

Planning ahead is critical. If poor weather is forecast during peak flowering, it pays to have a strategy in place before it arrives, rather than reacting once conditions have already turned.

In these situations, wet pollination is typically the most reliable option. Unlike dry pollen, a wet suspension can be applied across a wider range of conditions, including rain, cooler temperatures and overnight as it doesn't rely on bee and insect activity. This flexibility becomes especially important for short-flowering cultivars such as Gold3 and Red19, where the receptive window may only last two to three days.

Make sure your pollen is stored correctly and ready to go at short notice. Even a small break in the weather can be enough to get an application on, and being prepared to act quickly can make a significant difference.

It's also worth remembering that supplementary pollination delivers the most value in these conditions. A well-timed wet application, even in less-than-

At application, record details such as:

- Application method and pollen rate;
- Timing relative to flowering stage;
- Temperature and weather conditions; and
- Bee activity.

At harvest, focus on outcomes that reflect pollination success, including:

- Fruit set percentage;
- Fruit size and weight;

- Seed count; and
- Dry matter.

Where possible, repeat trials over more than one season. Results from a single year can be influenced by weather and flowering synchrony, so multi-year data gives a more reliable picture.

There are also existing resources available to support trial design and monitoring. See the "Where can I get more information?" section below.

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ideal weather, can be the difference between achieving a commercial crop and falling short.

What is ploidy and why does it matter?

Ploidy refers to the number of chromosome sets in a plant, and it plays an important role in kiwifruit pollination.

Different kiwifruit varieties have different ploidy levels. Hayward is hexaploid (6x), Gold3 is tetraploid (4x), and Red19/80 are diploid (2x). This matters because pollen compatibility depends on these levels.

As a rule of thumb, pollen can fertilise flowers of the same or lower ploidy but not higher. That means:

- Hexaploid pollen (green males) can fertilise green, gold and red;
- Tetraploid pollen can fertilise gold and red;
- Diploid pollen is limited to red varieties only.

In practice, most commercially available pollen in New Zealand comes from hexaploid green males such as Chieftain and M36. This means compatibility is rarely an issue for growers at present.

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However, this could change over time. If new pollen sources become available, particularly diploid pollen for red varieties, it will be important to check compatibility before application. Getting this wrong could result in poor seed set and reduced crop performance.

Do I need to sieve my pollen before use?

Whether you need to sieve your pollen depends on how it has been processed and how you plan to apply it. Not all commercially produced pollen is processed to a level where residual anther filament material has been fully removed, meaning it isn't always ready for direct use without sieving. Some pollen will still contain small amounts of fibrous material from the milling process. While this might not always be obvious, it can cause problems once you (or your contractor) start applying it.

In dry systems, this material can block augers or disrupt flow, leading to uneven distribution across the canopy. A quick pass through a handheld sieve before loading the applicator helps remove this debris and improve consistency.

The same principle applies to wet systems. Sieving before mixing the pollen reduces the risk of blocked nozzles and avoids interruptions during spraying, something

you want to avoid during a tight flowering window.

A quick sieve before use can save a lot of frustration once you start applying pollen, particularly if there's any residual filament material left in the product. If you're unsure how clean the pollen is, check with your supplier, but in most cases, sieving is a sensible precaution.

Where can I get more information?

For more details on how supplementary pollination could be useful in your orchard, including links to research, products, and advice, go to **www.kiwipollen.com** and Zespri's Canopy page "Understand Pollination and Pollination Systems" and the Kiwifruit Pollination Manual. ■



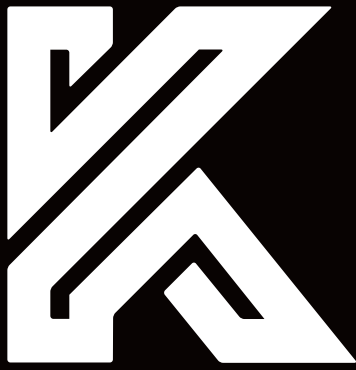
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The orcharding year has come full circle and starts again with winter pruning. As we all know **YIELD, TASTE, and TIME** are the Big Three drivers of orchard profitability.

WINTER PRUNING is a function of Yield. To achieve a consistent high yield of high quality fruit there must be a consistent canopy fill across all bays on the orchard; and the appropriate number of high quality winter buds. Winter pruning requires hands-on management with close supervision. High performing orchards ensure that every vine is performing to its maximum and this potential is set at winter pruning time.

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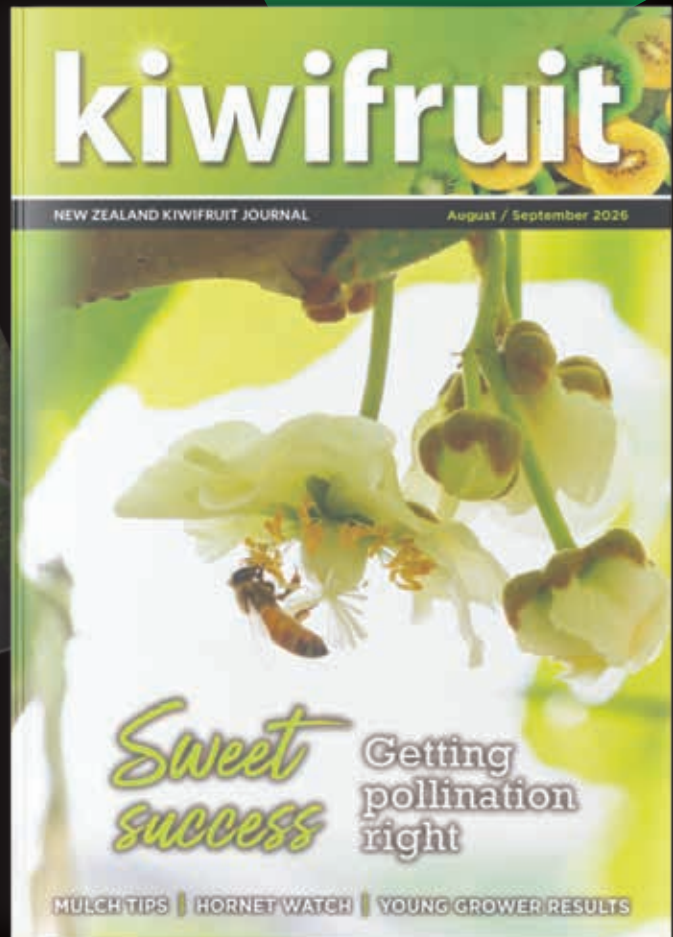
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Winter vigilance, spring readiness

Keeping the yellow-legged hornet firmly in focus

Lisa Gibbison - Kiwifruit Vine Health

As we move through winter, the yellow-legged hornet response has entered a quieter, but no less critical, phase.

During winter, the hornet life cycle slows right down. The worker and male hornets usually die off, and only reproductive new queens survive by hiding in sheltered places until spring. However, male hornets have been detected in New Zealand as late as June, suggesting their seasonal timing here may differ from overseas due to our local climate conditions.

While this means we're not seeing the same level of visible field activity, the response is very much ongoing and focused on staying ahead of any potential resurgence.

Field operations have scaled back from intensive searching to ongoing trapping and monitoring across the Auckland surveillance zones, maintaining a consistent watch for any unexpected activity. At the same time, winter is being used to strengthen the response by reviewing what's been learned so far; refining surveillance and detection strategies; and preparing tools, people and resources for spring deployment.

No hornets or nests have been found since early April (at the time of writing) but even without visible hornet activity, winter has remained an important period for preventing spread.

If any hornets have survived our operation, they're likely to be queens, hidden hibernating for the winter under bark, leaf piles and in woodpiles. Take care when gardening or shifting firewood. If disturbed, they can sting.

If you're moving equipment normally stored outdoors – such as caravans, boats, trailers – check before you go in case there's a queen hidden on board. Don't risk moving them to other areas.

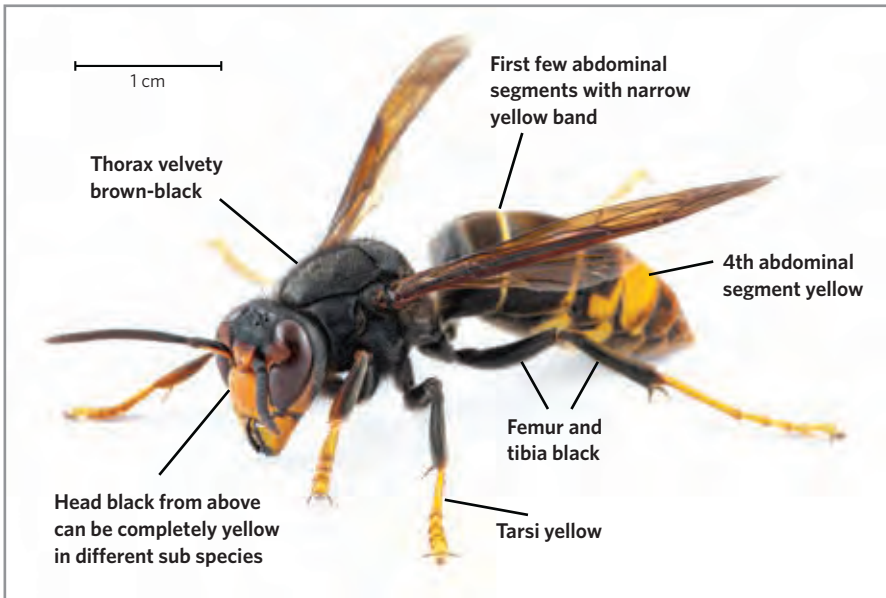
These small actions are an important part of



Tiny radio devices are used to track the yellow-legged hornet in the Auckland response zone.



A yellow-legged hornet on a custom made thick protective glove.



Yellow-legged hornet identifying features.

protecting orchards and the wider industry from potential impact on our access to pollination services.

As we approach spring, the focus shifts. If any queens have survived winter, they will emerge to establish new nests. This is the most critical window for detection and response.

Planning is already well underway to ensure the response can scale up quickly if needed, including reactivating and targeting field operations for early-season activity; having specialist tools and equipment ready, including tracking technology; and undertaking targeted surveys in higher-risk areas.

Eradication, if successful, will take time, requiring several years of surveillance with no detections before we can be confident there are no remaining hornets.

Encouragingly, progress so far has been positive, supported by strong collaboration between government, beekeepers, industry sectors such as kiwifruit, and the public - and high levels of community reporting.

For growers, it's important to remain vigilant and ready. Keep teams informed and aware, share key messages with staff and contractors, stay tuned for spring updates, and above all report anything unusual, even if unsure:



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- by calling the Biosecurity New Zealand hotline on **0800 80 99 66**,
- by using the online form at **report.mpi.govt.nz** - if you use this method, select the 'suspected yellow-legged hornet' option from the dropdown list.

Ensure you give your location when making reports and take a photo if possible and safe to do so.

While things may feel quiet right now, the work underway this winter is helping ensure we are ready to respond quickly - giving us all the best possible chance of keeping the yellow-legged hornet out for good. ■

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Stink bug season wraps up

Lisa Gibbison - Kiwifruit Vine Health

The brown marmorated stink bug season finished at the end of April, the eighth summer with specific measures in place at the border to stop this invasive pest.



Stink bug border measures

These include:

- ✓ Additional checks of cargo from risk countries during the high-risk season. Transitional facilities and the accredited persons working in those facilities play an important role in detecting stink bugs arriving in cargo.
- ✓ All vessels arriving in New Zealand with breakbulk (uncontainerised) stink bug-risk cargo are subject to deck-by-deck surveillance during the season.
- ✓ Officers and support staff meet flights and offer information about stink bugs to passengers arriving on high-risk flights.

During the 2025-26 high-risk season, which ran from September 2025 through to April 2026, Biosecurity New Zealand detected 62 live brown marmorated stink bugs, up from 40 the previous season.

The largest live find involved eight bugs in the baggage of a passenger arriving from Italy. The second largest was five bugs found in an air cargo consignment of steel from Canada.

Our biosecurity measures are proving very effective, with no evidence of any established brown marmorated stink bug population in New Zealand.

As in previous seasons, the number of

dead stink bugs found at the border remains high, reflecting the effectiveness of offshore treatment programmes. Importer awareness of stink bug requirements also remains strong.

The brown marmorated stink bug high-risk season runs over New Zealand's warmer months, aligning with the northern hemisphere winter when the adult bugs aggregate in sheltered enclosed spaces, making it more likely to hitch a ride here in imported cargo. Vehicles, machinery and parts continue to be major pathways.

Biosecurity New Zealand regularly reviews its measures to make sure they are working as intended, while still allowing trade to flow. For example, there was

recent consultation on proposed changes to import requirements for vehicles, machinery, and parts, including adding Uzbekistan to the list of countries that must treat goods for brown marmorated stink bug.

Monitoring also continues for countries where smaller stink bug populations have been identified. Goods from Argentina and Chile are now being checked, with further requirements ready to be introduced if the risk increases.

Important industry efforts

This work is supported by KVH's industry-led live brown marmorated stink bug surveillance programme, which completed

a 12-week trapping period from mid-January to mid-April and collected 235 samples.

The programme uses a risk-based approach, combining science, research and new trap technologies to improve early detection capability.

As readers will recall from a previous *Kiwifruit Journal* article, this year we had the first detection in a KVH-funded trap – highlighting the value of industry-led surveillance working alongside the national system.

A single male bug was identified on February 3 in Ōrākei, Auckland during routine monitoring, triggering a rapid investigation from Biosecurity New Zealand. Immediate site inspections were carried out, additional traps were deployed, and no further bugs were found.

Importantly, each detection continues to be thoroughly investigated to confirm there is no wider presence.

The Auckland find is a reminder that live brown marmorated stink bug continues to pose a real threat to kiwifruit growers and other horticulture sectors, but also provides reassurance that New Zealand’s layered biosecurity system is working as intended - detecting pests early and enabling a quick response.

While surveillance systems continue to strengthen, grower awareness remains critical. Early reporting of any unusual

BUG NUMBERS		
Sep 1 – Apr 30	2025/2026*	2024/2025
Total BMSB	576	1381
Live	62	40
Dead	514**	1341
Total detection events	135	218
Live detection events	46	37
Live BMSB by pathway		
Air cargo	5 interceptions 9 bugs	7 interceptions 7 bugs
Cargo	18 interceptions 22 bugs	11 interceptions 14 bugs
Mail	1 bug	0
Passenger	19 interceptions 27 bugs	14 interceptions 14 live bugs
Unknown	3 interceptions 3 bugs	5 interceptions 5 live bugs
Vessel	0	0

*These are provisional figures and may be adjusted.
 ** Biosecurity officers now send only some suspected dead BMSB for confirmation of identity. All detections were formally identified in previous seasons.

insects or damage supports rapid action and helps protect orchards.

Anyone who thinks they have spotted a BMSB is asked to catch it, snap it (take a photo), and report it using Biosecurity New Zealand’s exotic pests and diseases hotline 24/7 on **0800 80 99 66** or KVH on **0800 665 825**. ■



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Mulch on this

Slow for soil, fast for nitrogen

Sophie Merwe - GroWise

Mulch and compost are no strangers in kiwifruit orchards, they're used to supply nutrients and build soil quality that can support long-term productivity. Recent research, combined with earlier vineyard mulch trials, provides useful insight into how these materials behave in orchard systems. The emerging picture is nuanced: mulch and compost can support long-term soil function but they are less predictable as short-term soil improvers, they may have little or no impact on yield or quality and they can be more active nitrogen sources than many growers realise.



Banded compost in a young orchard.

Mulch and compost sit on the same continuum. Mulch is made up of fresher organic material that gradually breaks down into more stable forms, while compost is further along this decomposition pathway. Both rely on microbial activity to break down carbon and release plant-available nutrients.

Lessons from a comprehensive three-year Marlborough vineyard mulch study (1999–2001) remain relevant. While conducted in grapes, the findings can translate to kiwifruit – particularly when interpreted through the lens of different New Zealand soil types. The study found that mulch improved soil moisture retention, contributed nutrients, suppressed weeds and supported soil biology.

However, the trials also showed that soil responses were not uniform. Some changes, such as increases in soil organic matter, were inconsistent across sites and depended heavily on the underlying soil type. Organic inputs do not operate in isolation; they interact with the soil system they are placed into.

Importantly, the Marlborough trials



Compost is a regular soil amendment used in Kiwifruit orchards. It can provide significant nitrogen and potassium inputs.

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showed little consistent improvement in yield or fruit quality, even where soil conditions improved. Better soil does not automatically translate into production gains.

More recently, Zespri-funded compost research by the Bioeconomy Science Institute - featured in the August 2024 *New Zealand Kiwifruit Journal* and more recently in the June 2026 edition - examined what happens after compost is applied, particularly how nitrogen (and potassium) is released and lost.

The research suggests compost behaves less like a slow, steady nutrient source and more like a two-stage nitrogen input. An initial flush of nitrogen becomes available relatively quickly, followed by a slower period of release. Importantly, rainfall - not temperature - appears to be the primary driver. Once nitrate is released, it moves with water through the soil profile.

What this means

This shifts the discussion from simply adding organic matter, to understanding when nutrients become available and whether vines can use them before losses occur.

Soil type is central to this. Lighter, free-draining soils often benefit most from organic matter additions because they typically have lower organic matter levels, lower cation exchange capacity (CEC) and lower water-holding capacity.

nutrient movement and loss following rainfall. While compost and mulch can provide long-term benefits in these soils, nutrient gains may be short-lived if applications are poorly-timed.

Heavier soils generally retain both water and nutrients more effectively, allowing a greater proportion of released nutrients to remain available to vines. Even so, improvements tend to be gradual and cumulative rather than immediate.

This challenges the common assumption that compost or mulch will quickly 'fix' poor soils. The evidence suggests soil improvement in lower organic matter light soils is gradual, dependent on biological processes, and strongly influenced by soil type and seasonal conditions. Kiwifruit orchards already receive a continuous supply of organic material through leaf fall and prunings, helping build soil function over time. Additional organic matter may provide significant benefits where soils are degraded or low in organic matter, but long-term studies are still needed to quantify the economic return where soil quality is already good.

Where management becomes particularly important is with larger compost applications. Most compost used in the industry releases meaningful amounts of nitrogen soon after application, especially when rainfall or irrigation follows. Compost should therefore be viewed as a nutrient input as well as a soil amendment.

budbreak may increase the risk of nitrogen loss because roots are not actively taking it up. Aligning applications more closely with periods of vine demand (after budbreak) improves the likelihood that released nutrients are captured and used.

The key is to consider your starting point. If soil structure, organic matter levels and root health are already strong, the value of additional organic matter may be limited. On lower organic matter soils, mulch and compost can provide substantial benefits, but application timing and soil type remain critical.

Used appropriately, mulch and compost are valuable tools for building resilience and supporting soil function. Understanding both their benefits and limitations helps set realistic expectations: soil improvements take time, but nitrogen release can happen much sooner.

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Green S, Lawrence-Smith E and Knill K - *Rainfall drives compost nitrogen release*, *New Zealand Kiwifruit Journal* August/September 2024.

Lawrence-Smith E and Solomon O, *Timing key for compost*, *New Zealand Kiwifruit Journal*, June/July 2026. ■

As such, they are more vulnerable to

Timing matters. Applications made before

Growing for tomorrow

Consumers demanding more sustainability

Sophie Merwe - GroWise

Walk into any major supermarket in the United Kingdom or Europe today and you'll notice something subtle but significant: environmental sustainability is no longer a niche, it's becoming the norm.



Supermarkets are reflecting a shift in what consumers expect from the food they buy - that food is produced in a way that is safe, ethical, and not harmful to the environment.

There's a certain irony in this, given supermarket shelves are still filled with plastic-wrapped produce and convenience foods. But imagine you're living in a high-rise apartment in a large, polluted city. You've never set foot on an orchard. You're regularly exposed to news about climate change, environmental degradation, and concerns about how food is produced around the world.

If you're buying fruit grown on the other side of the world for your family, would you want to trust how it was grown? And if you're willing to pay a premium for healthy food, wouldn't you also expect confidence that it's safe, ethically produced, and not harming the environment for future generations?

This is the lens many consumers are now bringing to their purchasing decisions - and it's flowing directly through to supermarket expectations.

For New Zealand kiwifruit growers, this shift doesn't start from zero. Through the Zespri GAP programme - built on

GLOBALG.A.P. - and social responsibility requirements such as GRASP, growers are already demonstrating that the fruit they produce is safe, traceable, and grown with care for people and the environment.

At the same time, newer frameworks such as the LEAF (Linking Environment and Farming) Marque are emerging internationally and reflect how this assurance is evolving.

Building on what's already here

These systems don't replace what is already in place - they build on it.

Supermarkets are now asking a broader question: not just “is this food produced responsibly?”, but “can you show how it contributes to better environmental outcomes — both now and into the future?”

GLOBALG.A.P. is also developing an Environmental Sustainability Solution (ESS), designed as an add-on to existing certification to help growers more clearly measure and demonstrate environmental performance over time.

Like LEAF, it builds on practices growers are already familiar with, but places greater emphasis on outcomes, metrics, and continuous improvement across the whole orchard system.

In parts of the United Kingdom, LEAF Marque is quickly becoming an expectation for supplying fresh produce. British retailer Lidl has committed to sourcing all its fresh produce from farms certified to the LEAF Marque standard. Major retailers such as Tesco, Sainsbury’s and Waitrose have also committed to significantly reducing the environmental impact of the average shopping basket by 2030.

While the United Kingdom is not one of Zespri’s largest markets, these frameworks are influential and often set the direction of travel. Across global markets, including Asia and other high-value markets, the direction is broadly the same. Whether through retailer programmes, sustainability



Above. Living amid the realities of pollution and climate change, many consumers expect assurance that their food is produced sustainably.

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NEWS | UK

Supermarkets commit to halving environmental impact by 2030

Tesco, Sainsbury's, Waitrose, Co-op and M&S all signed a pledge which will force them to report to the WWF.



DEFORESTATION HARMS GLOBAL EFFORTS TO FIGHT CLIMATE CHANGE (LUIS BARRETO/WWF/PA)

PA MEDIA

AUGUST GRAHAM
6 NOVEMBER 2021

The bosses of five of the UK's biggest supermarkets have promised to halve the environmental impact of a weekly food shop by the end of this decade, as leaders meet in Glasgow at a key climate change summit.

Chief executives from Tesco, Sainsbury's, Waitrose, Co-op and M&S said they would work with the World Wide Fund for Nature (WWF) to reduce natural destruction.

benchmarking tools, or carbon footprinting initiatives, there is a clear shift toward greater transparency and accountability. In many cases, this is less about achieving a premium and more about maintaining access to key export markets.

More focus on growers

Because most of a supermarket's environmental footprint sits in its supply chain, this focus naturally extends back to how food is grown at orchard level.

Importantly, this is not about moving to completely different production systems or starting from scratch. Whether through emerging initiatives like LEAF or GLOBALG.A.P. ESS, they build on existing standards but go further by assessing the whole farm system, including soil health, water use, biodiversity, and energy efficiency. It reflects a growing expectation that growers are actively managing environmental risks and opportunities — and can demonstrate this over time.

The kiwifruit industry already has strong examples of growers putting environmental stewardship front of mind. The April 2026 *New Zealand Kiwifruit Journal* showcased award-winning orchards demonstrating biodiversity and strong environmental management, along with growers engaging in carbon neutral programmes and adopting integrated pest management approaches, including biological tools that support long-term resilience.

So, for growers, this is an evolution, not a reset - most practices are already in place. The shift is on bringing information together, strengthening it, and clearly demonstrating it across the orchard system by improving records, linking practices to outcomes, and showing ongoing improvement.

These frameworks are not about perfection. They are about demonstrating good management and a commitment to continuous improvement.

Media reporting of British supermarkets pledging to halve environmental impact by 2030.



For Zespri growers, this is a position of strength. The industry is already built on high standards and long-term stewardship. The opportunity now is to build on that foundation - ensuring systems are robust, well documented, and aligned with where global market expectations are heading.

Zespri's Lydia O'Meara says the Quality Systems team is reviewing customer requirements alongside existing and emerging environmental certifications to support market access and identify gaps.

"Our aim is to keep things as simple as possible - aligning standards, reducing duplication, translating complex certification requirements into kiwifruit-specific expectations, and integrating them into the existing GAP framework for streamlined auditing," says Lydia.

Keeping up with changing requirements and compliance documentation can feel overwhelming. To help, subscribe to Zespri's Bridging the GAP newsletter (search 'Bridging the GAP' on Canopy) which provides monthly updates, and

reach out to GroWise to see if we can help translate requirements into practical actions and how you can document them. ■

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Richard Pentreath

Answers under our feet

Growing awareness of importance of soil health

Jamie Troughton - NZ Kiwifruit Journal editor

Hawke's Bay organic grower **Richard Pentreath** isn't just building diversity into his business operation and lifestyle, he's also walking the walk in terms of biodiversity and soil health. He's completed a recent Kellogg's report which has not only highlighted the importance of the orchard underfoot but has also prompted a new consultancy quest.

It's a crisp winter morning in Hawke's Bay and a busload of agriculture students from New Plymouth are diving into the Pentreath family's rich orchard soil on an impromptu worm hunt.

They're teetering on the edge of boisterousness, with plenty of banter flowing, but otherwise the Francis Douglas Memorial College crew are fully engaged.

For teenaged boys, eyeing a career on the land, this is their jam; it's a practical, applicable task with well-defined results,

with the chance to get their hands dirty.

And it's equally satisfying for Richard Pentreath, who's coordinating and corralling with a smile on his face.

For the organic grower, who has 2.5ha of Hayward, Gold3 and male pollen kiwifruit on his block, helping the next generation understand the importance of soil is one of the key conclusions he developed from his recent Kellogg Rural Leadership research project.

"Soil is fundamental to our primary sector,

whatever the crop or product is, and yet we're always talking about water and water quality, greenhouse gas emissions, carbon emissions, CO₂," Pentreath says. "Not that many people are talking about soil health as a metric of how sustainable we are and I really wanted to better understand why that was."

The question he explored in his project was seemingly simple: should soil health be our number one sustainability goal?

The answer? Turns out it was slightly more complex.

The untold story of soil

Sustainable soil management has been a legal requirement in New Zealand for 30 years under the Resource Management Act (1991), but the country still faces significant challenges like urban expansion, nutrient loss, soil erosion, and soil degradation. New Zealand's soil science focus has shifted from supporting primary production to managing environmental impacts, including water quality and greenhouse gas emissions, while integrating Māori indigenous knowledge into scientific research.

WHAT'S STOPPING US FOCUSING ON SOIL?

	KNOWLEDGE GAPS	Soil is complex. We need better understanding, practical tools and more extension support to turn knowledge into action.
	MINDSET & PEOPLE	Change starts with mindset. Trust, values and seeing real-world results are key to adopting new practices.
	BUSINESS REALITIES	Profitability, time, labour and market demands drive decisions. Soil health must make good business sense.
	INDUSTRY DYNAMICS	Collaboration, good extension programmes and shared goals can drive positive change.
	REGULATION & MARKETS	Market expectations are a strong driver of change. Smart policy and industry-led initiatives can support progress.



Francis Douglas Memorial College students conduct a worm survey.

"A lot of Kellogg students probably say it but next time, I'd probably narrow the question down," he laughs. "But I definitely now have an appreciation for why we talk more about those other things. A lot of it is simply the complexity - a good soil in one region could be a terrible soil in another region, if you're just looking at standardised metrics and measures."

To help find those complex answers, Pentreath reviewed a huge amount of international research, and then interviewed growers, researchers, industry leaders and policy experts.

One conclusion became clear, he says: while there is broad agreement that soil health matters, there is still significant work to do before it becomes a central measure of sustainability across New Zealand horticulture.

So why is soil so important?

Globally, soil degradation is emerging as a major environmental challenge.

The European Union Food and Agriculture Organisation estimates that up to 75 percent of the world's soils are already degraded.

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Pentreath's research points out that this matters because soil is much more than a growing medium. Healthy soil is a living ecosystem that supports plant growth, regulates water movement, stores carbon, and sustains complex communities of micro-organisms. When soil health declines, the effects ripple through entire communities.

In New Zealand, productive soils face a dual threat. Firstly, there is the ongoing degradation of soil through unsustainable management practices. Secondly, highly productive land is increasingly being lost to urban expansion.

But Pentreath is, by nature, an optimist and he likes to point out that there are positive signs that soil's importance is being recognised.

There's the science, for example.

New tests (such as eDNA and qPCR) can detect tiny traces of genetic material left behind by earthworms in soil, helping evaluate biological soil health and earthworm abundance and diversity without the need for time-consuming, manual hand-sorting.

A hot water extractable carbon (HWE) test measures the 'active' or easily-eaten carbon in soil by looking at sugars, amino

acids, and root parts. A high HWE level typically means a healthy, fertile soil.

"We're starting to get better measures of soil carbon and we're starting to understand it a bit more but when it comes to biodiversity and water cycles

and nutrient cycling, those are big complex things," Pentreath explains.

He believes regional councils, for example, could set up robust monitoring programmes that would at least show change over time.

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“We’re starting to get better measures of soil carbon and we’re starting to understand it a bit more but when it comes to biodiversity and water cycles and nutrient cycling, those are big complex things.”

“The exact values are possibly less important but we want to see the right direction of travel.

That’s a huge opportunity that we’re not exploring but I’ve also got far more of an appreciation of why people aren’t doing it and why it’s not necessarily easy.”

A road full of learning

If an orchard full of schoolboys seems less than relaxing, it’s worth pausing here to put out some of the skills Pentreath has picked up over the past 30 years, and why he feels qualified to recently launch a new career as a consultant under the Boost Horticulture banner.

In fact, it’s not even new – when he moved home to Hawke’s Bay from Bay of Plenty in 2014, his first job was as a horticultural consultant for AgFirst.

Before that, armed with a Bachelor of Applied Science (Horticulture) from Massey University, he’d had stints with Freshmax, Corbans Viticulture and Zespri, the latter a four-year tenure as orchard productivity manager.

And after his AgFirst consultancy, he also fitted in eight years as Regional Manager for Ngai Tukairangi Trust’s kiwifruit Hawke’s Bay operation, which included the development of apple orchards.

When he moved to Hawke’s Bay 12 years ago with wife Jo – now the executive manager





of Citrus New Zealand – and their two children, he also bought a small kiwifruit orchard from his parents.

Formerly a traditional mixed crop operation with stonefruit and kiwifruit (some vines are approximately 40 years old), the Pentreaths have assiduously removed most of the nectarines, peaches and plums and now organically grow 0.7ha Hayward, 1ha Gold3 and 0.7ha of male vines for pollen.

It's not their only diversification.

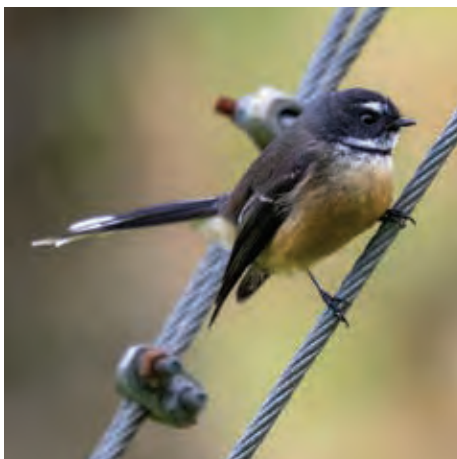
A flock of SheepMaster sheep patrol under the vines, mowing the sward and cycling nutrients, while providing meat and lambs for sale, jockeying for priority with wandering chooks.

They've recently invested in a new pollen extractor and mini mill from Te Puke's Fraser Gear, and have launched their own pollen brand, Boost Pollen.

"We've always got those multiple income streams but also play in the high-value streams and we've also been quite brutal – if it hasn't made money, we've pulled it out."

And now his second consultancy career is about to begin, alongside his other strands.

"I really want to be able to help people take that step of being a bit softer with the environment, or shifting the dial so they're actually making a positive impact."





Richard Pentreath and his new pollen extractor and mini mill.

Turning the dial

For Pentreath to get to this point has required – and this is another fundamental Kellogg study conclusion – his own personal change in mindset, which evolved while growing kiwifruit.

“When I stepped out of the mainstream conventional system, my level of enjoyment just rose dramatically. Everything became more interesting because I was thinking more deeply about why I was doing things.

“For example, I used to farm out responsibility for crop nutrition to a consultant for years and years, thinking he was the expert. At the same time, I didn’t understand it enough to judge what he was recommending, because you can get bogged down in the chemistry. I thought ‘hang on, nutrition is a huge part of our system’ and I thought I should probably understand a bit more about it and look into it deeper.”

He also sees it as part of his mission to demonstrate small horticultural operations can still be viable and successful.

“It’s taken us more than five years to get to a point where our input levels are really low, and now we’re just fine-tuning. We’re putting on relatively small amounts of things like boron, silica and nitrogen, where and when we need it and focusing on the important ratios.

“It makes it so much fun, because you

really have to better understand the whole system. It’s easier to go out and grow big crops, because we’ve got all the tools accessible, but there’s way more challenge and reward in doing it as smart as you can with the least input and doing the least damage.”

Regenerative and financially rewarding

It’s no fluke the young Taranaki schoolboys ended up on Pentreath’s orchard either. A friend runs the horticulture programme at the local Eastern Institute of Technology and leans on Pentreath whenever he needs to showcase a kiwifruit operation, to break up all the apple orchards.

Pentreath has been and is still involved in a number of advocacy groups, like the Hawke’s Bay Horticulture Advisory Group, Hawke’s Bay Fruitgrowers’ Association and Hawke’s Bay Future Farming Trust.

And while his regenerative skills make it easy conducting worm counts and showcasing the importance of soil, he was also able to impart some commercial advice to his young charges.

“I was talking to them about value and telling them one of my favourite sayings – that yield is for vanity and profit is for sanity. Quite often, people just want to talk about their yield.

“Where I can add value is in the business side, where the commercial realities meet the practical and the productivity side.

There are plenty of people out there who know more about regenerative farming than me but I’ve got enough background in the science space and the business space to tie it together. Eventually, I’d love to see more systems where we’re able to collect really meaningful, robust metrics, that can paint a picture of how we’re improving. Then we can more easily attach a dollar value to it, rather than just be feel-good.”

So what’s next?

When Pentreath talks about diversity in his own orchard, it’s worth pointing out that it’s as much about extracting value as it is about extracting profit.

“I’m really interested in maybe having a community garden, giving a bit of dirt to a team who are passionate about it, and telling them to go for gold. That could be an amazing education piece, get people more engaged.”

And he’s also keen to see more people across a wide range of industries and interests just get together and share ideas.

“We still largely operate in silos and there’s such a big opportunity to work more collectively, at regional scale.”

To read Richard Pentreath’s Kellogg report in full, go to: www.ruralleaders.co.nz/report/answers-under-foot-should-soil-health-be-our-no-1-sustainability-goal/

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