The ORCHARDIST®

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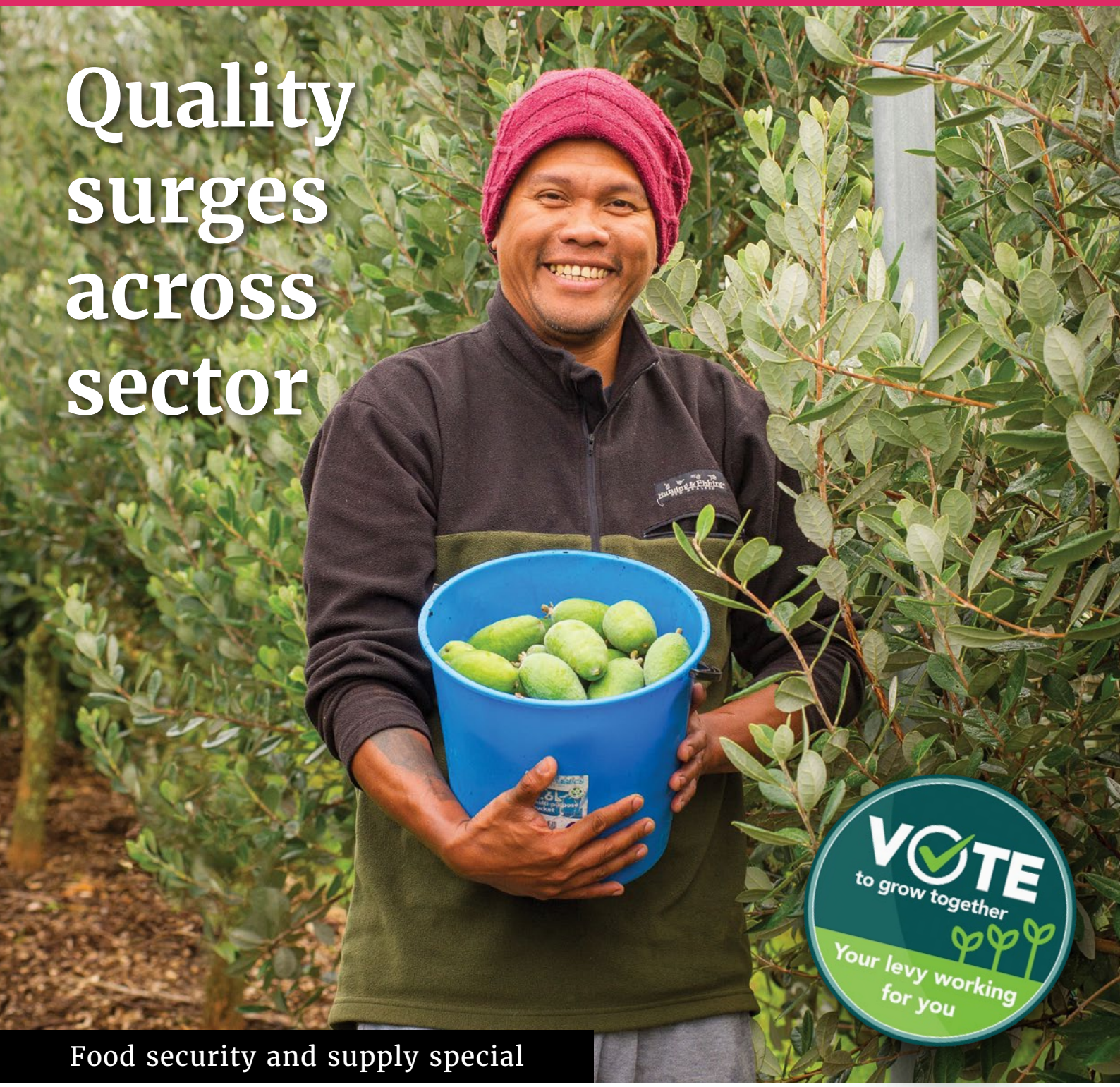
HORTICULTURE NEW ZEALAND

# Quality surges across sector




Food security and supply special

# TECHNICAL

## THE LATEST INNOVATIONS AND IMPROVEMENTS

*Summerfruit NZ hosted a field visit at the Affleck orchard in April to share learnings from the project over the growing season. Pictured (from L to R) are Sally Anderson, Summerfruit NZ research and development manager, Dr David Pattemore, of Plant & Food Research, orchard owner Craig Affleck and Dr Charles Merfield, consultant*

# Summerfruit understorey project

*Insect abundance increasing by two-thirds and the mower staying in the shed are two of the benefits seen in the first year of a Summerfruit NZ and A Lighter Touch understorey planting project.*

Gina Jewell : A Lighter Touch programme

**The project aims to establish understorey planting in summerfruit orchards to enhance biodiversity and is looking at associated co-benefits. These include weed management, improved *botrytis* disease control through covering bare ground, and improvements to soil health.**

Summerfruit NZ technical adviser Richard Mills says the project is leveraging knowledge gained from the A Lighter Touch (ALT) *Biodiverse planting in perennial crops* project, where beneficial planting was established in two Gisborne citrus orchards to enhance biodiversity and natural predator populations.

"Summerfruit NZ looked at that work and thought, there's something we could learn from here, and trial with our growers. The A Lighter Touch support has been invaluable in getting the summerfruit project underway, both the financial contribution, and the technical resource that investment enables."

While the project is first and foremost an understorey agroecological project, Richard says Summerfruit NZ is particularly interested in the associated co-benefits.

"The ability to grow more and get some more organic matter in the soil is just huge, particularly in Central Otago. In Hawke's Bay we might have organic matter levels naturally of about five percent, whereas in Central Otago, to get to two percent in places is a big ask.

"The more organic matter in the soil, it's going to hold on to nutrition, it's going to hold on to water and slow the percolation through the soil. If you can hang on to water instead of it flowing across the top, that's a big benefit."

The Summerfruit project involves four orchards in Central Otago and one in Hawke's Bay. The first understorey was sown in a Roxburgh apricot orchard in April 2023, followed by a Cromwell cherry orchard in September. The remaining three orchards are scheduled to plant their understorey in April.

*The understorey in the first orchard planted as part of the project, an apricot block at Fairview Orchard in Roxburgh. Pictured is the understorey in February 2024, ten months after planting, having come through a management season with vigour. Photo by Kate Colhoun*

A mix of 17 beneficial annual and perennial species was planted at the initial two orchards, with the species mix used for the ALT citrus project being adjusted to suit Central Otago growing conditions.

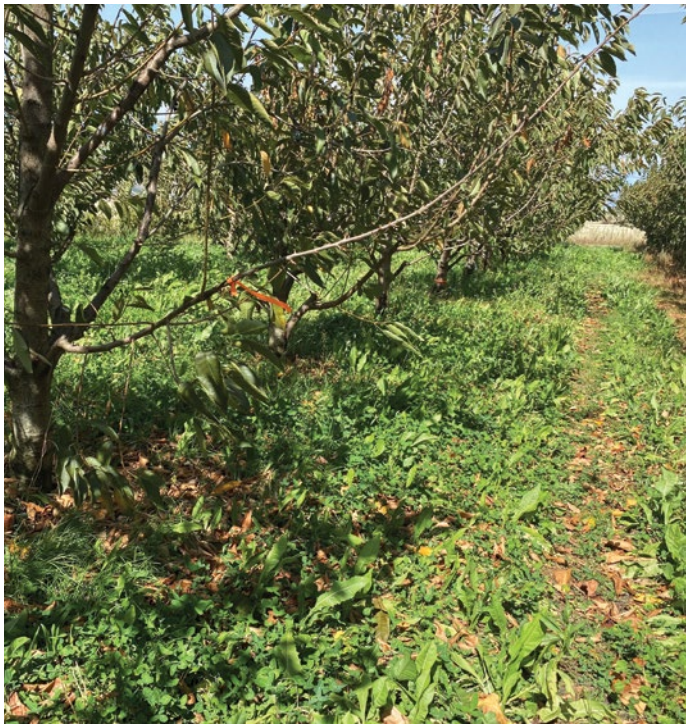
Over the past summer, research associate Kate Colhoun of Plant & Food Research has been a fortnightly visitor to both orchards, monitoring the understorey and conducting insect sampling.

From October Kate has noted which plants have established, when they are flowering, and whether any other plants not in the seed mix have grown. In November insect monitoring started, using a sweep net to collect samples at five points in the understorey. Insect samples were also taken from other parts of the orchard not part of the project, to provide a comparison.

The results have been clear-cut. In one orchard, 2500 insects had been recorded in the understorey across a three-month period, compared to 1500 in the control area of the orchard.

Kate says the amount of flowering material in the understorey is a key factor in attracting one-and-a-half times more insects, many of which are beneficials, such as tiny parasitoid wasps, lacewings, ladybirds, predatory mites and hoverflies.

"All these little parasitoids and hoverflies, the adults feed on those flowering plants, but they have a special insect they need for reproduction. It's at the reproductive stage they need a host insect to feed on, such as leafroller or other insect pests in the orchard."



*The understorey at the Afflecks' cherry orchard at Cromwell six months after planting, holding up well having gone through a management season, including spraying and picking. Photo by Kate Colhoun*

Non-flowering plants also play an important role in providing shelter to boost and maintain the population of beneficial insects to attack pest insects. New Zealand agroecologist Dr Charles Merfield, who researched the plant species selection for the ALT citrus project, emphasises the need for biodiverse planting to provide not only flowering plants as sources of nectar and pollen for beneficial insects, but also plants which provide refuge – protection for beneficial insects from their predators, and shelter year-round.

With results to date demonstrating the understorey planting is enhancing the insect population and diversity, "the next step is to establish does that mean more parasitism of orchard pests, are we seeing the crop protection benefits?" Kate says.

Richard Mills is considering how future orchard management practices could change with a better balance of insects – "more predators, less prey" – or in simple terms, more good insects, less bad insects.

"The obvious example is aphids, which can be a problem in stonefruit orchards. They're lovely juicy prey for every predator insect to chew on, and they're generally slow moving. By creating a place in the orchard for beneficial insects to live, and food for when there's no aphids around, can we ultimately reach a place where we don't have to spray for aphids anymore?"

Cromwell orchardists Georgie and Craig Affleck have planted half a hectare of their cherry orchard as a demonstration block for the project. They are particularly interested in the soil benefits, with some parts of their orchard being very poor soil – "there's no organic matter at all."

Georgie and Craig previously farmed a mixed cropping, sheep and beef property in northern Southland, and had seen benefits of regenerative planting through work they had done with Mainland Minerals. When Summerfruit NZ told them about the understorey project, they jumped at the opportunity to be involved.

About half of their block is heavier soil and the remainder is the stoney, gravelly soil they are looking to improve. They planted the understorey using vineyard equipment to cultivate and sow the seed between the rows, and a hand spinner underneath the trees where the machine wouldn't fit.

"Ideally you'd plant your understorey before you planted the trees, but even in the areas where I couldn't cultivate, where I'd just sprayed off the ground, the seeds on top still germinated. You've just got to mix it in," Craig says.

Despite the Afflecks' soil differences, the understorey established in both. The more stoney soil was a bit slower, not as thick, and dried out more quickly – not unexpected given the soil type.

"It's been really exciting to see what has come through, and the growth. It looks a lot more lush than grass growing in the rows, and it looks and smells a lot better," Georgie says.

Another bonus has been savings on diesel and mowing. "We haven't mowed it at all this year," Craig says. "At harvest I just rolled it, which flattened it down enough for the pickers with their ladders. There were no complaints from them."

As the cooler months roll around, the understorey will die down and be mulched into organic matter, creating the layer of compost supporting the understorey to self-seed and regenerate.

Craig did need to use a line trimmer to cut the understorey back around the sprinklers, as it was restricting the water distribution. He sees this as a lesson from the project, saying while he would be happy to plant the understorey in the rows across the entire orchard, the under-tree management needs further consideration.

Richard Mills agrees, with ideas discussed including weed spraying around the sprinklers, or raising them on a stake to better enable water dispersal. Understanding how management practices need to adapt to accommodate understorey planting is another of the project's objectives.

"We've got 17 species in the seed mix. The first step is about learning which ones establish in which environment. In the future we may find we have three species that go in what was the herbicide strip under the trees, and three completely different species that are sown down the middle."

Already, the project has seen differences in how the seed mix establishes geographically. At Richard's home orchard near Hastings he planted some 20m by 5m trial sites 18 months ago and has been comparing his results to those seen in Central Otago. In Richard's plots species like chicory and plantain have established far more quickly and essentially dominate, smothering out the other plants.

In Central Otago the plant species established more evenly, naturally changing through the season. "At the start, the phacelia comes through quite fast, and the coriander started flowering early, along with the alyssum and some of the other annuals like chickweeds. As the season went on, the clovers really came into their own, followed by the grasses," Kate says.

However, the grasses established differently in the two Central Otago orchards.

> **To do something different will require a mindset shift, and maybe some machinery shifts as well**

"At Roxburgh the grasses grew really well. There was beautiful cocksfoot and ryegrass, then timothy and the fescues as well. At the Afflecks' orchard (at Cromwell), there wasn't as much grass establishment, but there was lots of good clover, particularly the strawberry clover and the white clover."

Richard says this learning is exactly what the project is about. "We found in Hawke's Bay chicory is not a good choice. In Central Otago we may find there's something else that doesn't work. The seed mix will probably alter as the project progresses."

The longevity of the understorey is also key. "We need to mimic what happens in a standard orchard. When you plant a new orchard you put a grass sward down, and you never redo that for the life of the orchard, for 15 or 20 years. It's going to get thinner and it's going to get weedier.

"With this project we need to find a management system that doesn't need replacing very often. Is that ten years or 15 years, or the life of the orchard? We need to keep the understorey healthy enough and the sward thick enough that it doesn't get overtaken by giant mallow or hemlock or other weeds."

Over the next two years the project will be looking to see which plants have established in the shade, and which are happier in the more exposed, sunny environment, as well as comparing plant growth in the two regions.

Sharing knowledge from the project is also important. Summerfruit NZ held a field visit at the Afflecks' orchard in April, and will provide further information at grower events in Hawke's Bay and Central Otago in October.

Richard is keen to see grower groups establish to share knowledge and experiences. "For many of us old-school orchardists, we've only ever known the bare dirt under the trees, the herbicide strip. To do something different will require a mindset shift, and maybe some machinery shifts as well."