

INSIDE DAIRY

Your levy in action



FARMING ^{AT} THE FRONTIER

What could our farms look like in 2030?

// Plantain's power confirmed **12** // Scientists in your corner **14**

// Tools for autumn **22** // Getting the best from fodder beet **25**



OVER THE FENCE...

Scientific research into better farm systems, and how we can adapt to challenges, remains one of the best ways to make informed decisions.

Farmers have so many options at their fingertips to improve profit, reduce footprint or farm better – and it's independent research and development that helps support decision-making on the farm. We know science helps farmers become more internationally competitive, locally responsible, and resilient.

Science is one of DairyNZ's most recognised focus areas. Decades of farm systems science expertise sits within our research team (meet some of our scientists on pages 14-15), building on previous work that's delivered innovation and growth to Kiwi farms.

This issue of *Inside Dairy* highlights some of our research into topics behind the farm gate, like environmental footprint, forages, animals and workplaces. We're also taking a fresh look at how we can build our international competitiveness – see our cover story about the exciting Frontier Farms project.

National issues are analysed through a range of science programmes. One example is improving cow fertility, delivered through the multi-year Pillars programme on breeding decisions, supplement use and early predictor traits for fertility.

Meanwhile, we're addressing local challenges through research at a regional level. This includes local science and information-sharing into nitrogen loss, autumn calving and climate-resilient farm systems.

In recent weeks, many farms around the North Island have been responding to the impacts of Cyclone Gabrielle. Our regional teams have been providing one-to-one support with affected farmers and working closely with Rural Support Trust, MPI and other agencies.

As we all know, recovering from an adverse event is challenging and confronting. Many of you will know someone impacted and you'll have provided practical or moral support. I encourage all farmers to keep connecting with DairyNZ, other agencies and your neighbours, as we continue setting up for next season.

I always appreciate your feedback, so please drop me a line at tim.mackle@ceo.dairynz.co.nz

Tim Mackle
Chief executive | DairyNZ

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On the cover:

DairyNZ Frontier Farms project scientists Chris Glassey, Paul Edwards and Jenny Jago with Ohinewai farmer and project member Colin Hickey (checked shirt).



Reader survey – be in to win

What are you enjoying about *Inside Dairy* and how could we make it a better read for you? Complete our quick survey and go in the draw to win one of five \$100 Farm Source store vouchers. Head to bit.ly/insidedairyfeedback
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Farming at the frontier

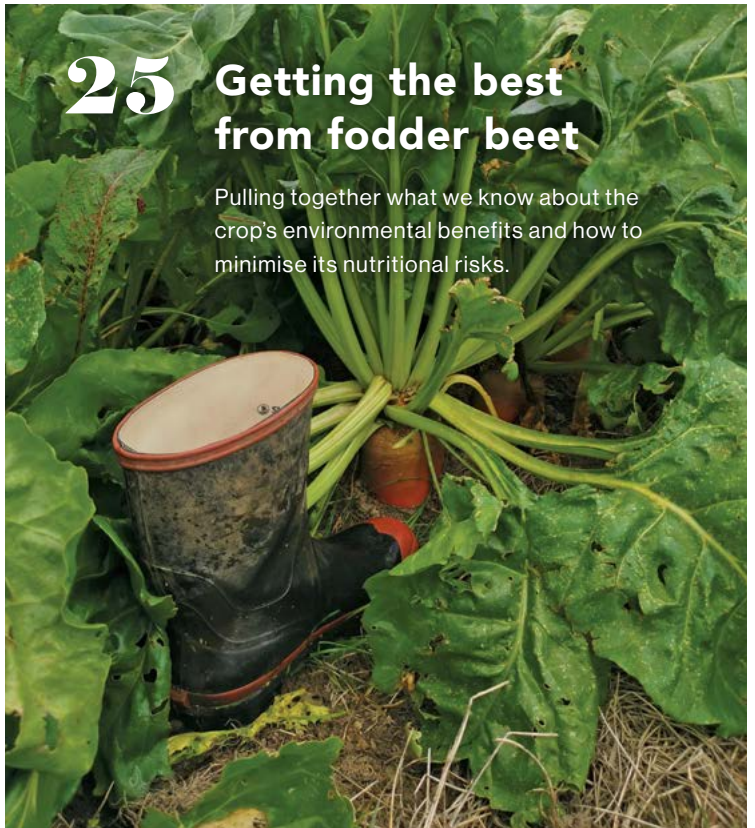
What might the NZ dairy farm look like in 2030? Scientists and farmers are on the case.



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Research confirms power of plantain

Farmer experience is backed up by new trial data.



25

Getting the best from fodder beet

Pulling together what we know about the crop's environmental benefits and how to minimise its nutritional risks.



We appreciate your feedback

Email insidedairy@dairynz.co.nz or call us on 0800 4 DairyNZ (0800 4 324 7969).



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Recovery: one step at a time

How might farmers establish a new routine after adverse weather events?

This summer's high rainfall, strong winds, flooding and slips have challenged many New Zealanders, including hundreds of dairy farmers.

Supporting affected farmers while recognising each region's needs has been an important part of DairyNZ's response, says Lower North Island regional leader, Mark Laurence.

"For example, Hawke's Bay and other areas experienced significant flooding during Cyclone Gabrielle, but we still have ongoing issues like power outages and road access.

"On the other hand, in other regions, power came back on relatively quickly after the cyclone, but many farms were significantly damaged."

Mark kept that regionality in mind when putting together information to help dairy farmers get back up and running again (see the flyer at dairynz.co.nz/cyclone).

"It covers getting your team together, making a 'to do' list and identifying priorities. It's now time to think ahead too," he says.

That includes considering extra challenges around setting up for calving, ensuring compliance and consents are up to date, organising transport for cull cows, reducing effluent pond levels if needed, and updating animal health and health and safety plans.

Cows also need to meet – but not exceed – their BCS targets, says Mark.

"Earlier dry-off means this period might last longer than usual, so if cows go past their target, they could experience metabolic problems at calving time."

DairyNZ's online resources include information on how to prepare for adverse weather events in the future, too, says Mark.

Farmers affected by recent events can also contact DairyNZ directly if they need more advice or assistance.

"Please, reach out and talk to us, even if you're not sure whether we can help, that's the biggest thing.

"A farmer rang us recently and said, 'you can't really help me, my biggest problem is I can't find an engineer to certify my bridge'. However, we were able to make that connection for him."

Meanwhile DairyNZ continues to work closely with farmers, Fonterra, MPI, Rural Support Trust, Federated Farmers, and other rural professionals to provide support to those who need it.

Go to dairynz.co.nz/adverse-events for info about preparing for and overcoming cyclones, floods, power outages, missed milkings and more.

Sector groups and farmers working together to clean up cyclone-affected farms.





Kiwis are seeing your story

A campaign to build the public's trust and pride in dairy farming has been reaching New Zealanders everywhere from primetime TV to a popular gaming platform.

'Better', the latest phase in our levy-funded Here for the Long Game campaign, was launched last year with a plan to get your story in front of millions of Kiwis.

We've placed the commercials in highly viewed places such as 6pm news broadcasts, *The Chase*, *The Block*, OnDemand TV, YouTube, Stuff and MetService, and even on a gaming platform called Twitch.

In November and December alone, there were **26 million opportunities** for Kiwis to have seen the commercials.

The campaign is also driving visits to the Here for the Long Game site (dairynz.co.nz/the-long-game), where Kiwis can learn more about what dairy farmers are doing to care for the environment. The site had more than **30,000 visits** over November and December.

Through our Public Perception Survey, we'll soon measure how the campaign has driven public trust, and we'll share these results.

DairyNZ in schools

DairyNZ's new in-school education resources were used by 70,000 students and teachers last year.

We've partnered with House of Science to deliver four learning kits, including the new dairy-focused Moo to You kit. The other kits – Water Analysis, Climate Change and Soil Secrets – also feature the relationship with dairy and how dairy farmers contribute to looking after the environment.

House of Science runs a science education programme in primary and intermediate schools. It provides hands-on science kits, complete with equipment and instructions.



Students from Te Puke Primary School get hands-on with the Moo to You kit.

Register now



Farmers' Forum is back. Science is in the spotlight at this year's events, with an exciting range of speakers sharing practical science for dairy farmers.

Get the latest on reducing methane emissions, using plantain to reduce nitrogen loss, remaining profitable in a high inflation environment, modernising dairy workplaces to benefit farm teams, and harnessing new technology.

North Island: 27 April 2023

Don Rowlands Centre,
Lake Karapiro, Cambridge

South Island: 9 May 2023

Ashburton Event Centre, Ashburton

Register at

dairynz.co.nz/farmersforum

How DairyNZ science supports farmers



DairyNZ's science projects are designed to help farmers become more internationally competitive, locally responsible and regionally resilient. Here's an overview of what we're working on.

Reducing environmental footprint, while increasing profit



Greenhouse gas emissions

AgResearch analysis (commissioned by DairyNZ) showed NZ milk's on-farm carbon footprint (fat and protein corrected milk) is 65% lower than the average of 19 countries studied. We're now working with other research organisations and companies to develop solutions to reduce methane emissions by 10% across the dairy sector for on-farm testing by 2025, and farmer use by 2030.

Reducing N loss

DairyNZ, research organisations and partner farms trialled fodder beet, catch crops and pasture species to reduce nitrogen (N) leaching by 20% or more as part of Forages for Reduced Nitrate Leaching. We've also partnered with Tararua farmers to trial plantain, and with Selwyn and Hinds farmers to identify the best strategies to significantly reduce N loss.



Southern wintering

DairyNZ is working with Otago and Southland farmers to study how to improve water quality, reduce greenhouse gas emissions, and new wintering infrastructure performance.



Improving water quality

DairyNZ contributed to research showing that 45% more N and 98% more phosphorus would have entered rivers from dairy-farmed land from 1995-2015 if farmers hadn't changed their environmental practices. We're now working with farmers to research and roll out strategies to continue improving water quality. This includes researching plantain and low-N farm systems. We're also researching the effectiveness of wetlands and bioreactors in reducing waterway contamination.

Supporting regional research

DairyNZ supports research to address challenges in Northland, Waikato, Bay of Plenty, Taranaki, Canterbury, the West Coast and Southland. Research includes reducing N loss, autumn calving, and building climate-resilient farm systems.





Improving cow fertility, genetics and wellbeing

Improving cow fertility, health and longevity

Our Pillars of a New Dairy System programme proved the superior reproductive performance of high-fertility Breeding Value cows. It also found that puberty timing and other novel measures were early predictor traits for fertility. Researchers also developed a new functional survival trait, and found feeding a specific zeolite supplement before calving reduces milk fever.

Improving animal wellbeing

We're working with farmers and technology providers to explore how new technology can improve animal care and benefit farmers. This includes researching and developing new ways of measuring cow quality of life.



Genetic gain

NZAEL introduced a new udder overall measure into Breeding Worth, to help farmers better identify which animals suit their needs. NZAEL is now updating the fertility trait measure to include conception dates, and researching using genomics to improve genetic gain.

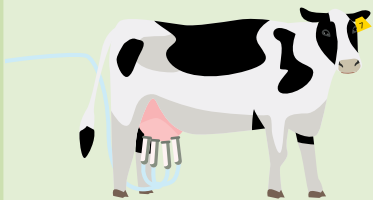
Fodder beet

By working with farmers, we developed recommendations for fodder beet use to meet animal health, production and environmental goals.

Creating better workplaces

Flexible milking

DairyNZ carried out controlled research experiments and worked alongside farmers to show that flexible milking strategies reduced milking times, with only small effects on milk production. Body condition scores improved and lameness was reduced.



Modern workplace design

We're designing options with farmers to reduce working hours and improve people productivity using new practices and technologies. We're also researching ways to reduce sprains and strains on-farm.

Building international competitiveness

Through our Frontier Farms project, we'll design and test novel farm systems to help us better perform against US mega-dairies, milk alternatives and other competitors.



Improving forage performance

We're continuing work to understand recent Forage Value Index validation trial results, and to improve the index for farmers. We're also assessing climate change impacts on pasture-based farming, and developing climate-adapted feed supply systems.



For more, go to dairynz.co.nz/research

Farming at the frontier

**Enterprising farmers, scientists
and rural professionals are
exploring what the NZ dairy
farm will look like in 2030.**



Nicola and Colin Hickey are looking to the future.

“My son believes, in 20 years’ time, he’ll be able to physically operate the farm by using his Farming Simulator gaming console, which is pretty crazy.”

North Waikato farm owner Colin Hickey is talking about Thomas (13), who with his sister Mikayla (11), has his sights set firmly on a dairying career.

“Thomas and Mikayla are both keen on farming, and they’re excited that in the future they could be more connected with the farm using technology,” says Colin.

“As I’m a Halter farm user and my cows move themselves anyway, the kids are already in touch with that technology and they can see how that will get better. Doing things like milking using the computer console – all the gaming skills they’ve got will come to the fore.”

This focus on the future explains why Colin put his hand up to get involved in DairyNZ’s Frontier Farms project. It aims to keep New Zealand dairying competitive by looking a decade ahead, identify ways to head off challenges that might not be on many farmers’ radar right now and capitalise on opportunities.

Core collaboration

Colin and Southland farm owner Ruth Pranker were among several farmers involved in a DairyNZ Frontier Farms design workshop in October 2022. Many of DairyNZ’s staff and rural professionals at the workshop are past or current dairy farmers too.

“I think it’s so great that farmers are at the core of this particular project,” says Ruth, who farms at Winton. “We’re the ones ‘doing it’, so it’s essential we have some input into what the project’s solutions might be.”

Colin says the value of a project like this focusing so far ahead, is that farmers could hit the ground 20 years ahead of the game.

“With everything that’s coming at us from every angle, farmers need to be on it. It’s absolutely what DairyNZ should be doing, and I think it’s fantastic.”

He also believes it’s critical to have the right experts in place.

“Those experts get forgotten about when you’re out on the farm day to day. But when there’s a massive problem looming, we need those experts to have the solutions. They’re extremely valuable in testing theories that might help us solve problems.”

Having farmers contributing ideas and feedback is an important part of the project, says Paul Edwards, DairyNZ science lead and Frontier Farms project lead.

“They’ve been a key part in setting the direction and we look forward to their continued input when piloting their ideas next season. We’d also like to see

them involved if we progress our ideas to a farm-scale demonstration too.

“We know Kiwi farmers are real innovators, so it’s exciting to be working closely with them on designing systems and improvements.”

Trial by tenacity

Staying ahead of things and planning for the long game is a strong driver behind how DairyNZ invests the farmers’ levy, says Paul.

“With this project, we’re collaborating with sector partners and farmers to develop working farm demonstrations that test new farm systems. The work we’re doing now is piloting a range of ideas: some of them are novel and new, and some are reinventing old ideas in a new context.

“We know that when we design novel systems, they won’t always perform as we anticipate. A lot of our learnings will be in understanding why our system changes didn’t work the first time, and then refining our ideas so they perform better,” says Paul.

Colin hopes Frontier Farms will inspire the next generation of farmers, like daughter Mikayla.



Frontier and centre

NZ exports 95% of its milk, so we need to ensure it's a more attractive product to key markets. In 2022 we looked at the future competitiveness of US mega-dairies and identified three farm system design challenges to achieve in our pasture-based dairy system to maintain our position.

"The first two challenges were to create time and labour-saving benefits while reducing the cost of production," says Paul. "The third is also important: that there's enough transparency across our farming practices to ensure they remain acceptable to consumers and the wider community."

After discussing these three challenges, the participants of the October 2022 workshop settled on designing a system to 'flatten the peak' in labour requirements across a season (i.e., over calving and mating) and within a day (i.e., for milking).

More specifically, to flatten the requirements across a season, the group came up with extended lactation with a 24-month calving interval as the preferred solution. This approach has half the cows calving one year, the other half the next year.

"Clearly this is pushing the frontier, so we're planning farmlet trials to pilot this system at DairyNZ's Scott Farm in the 23/24 season, ahead of any farm-scale demonstration," says Paul.

To flatten labour demand within a day, the project team will explore batch milking via robotics. This is where

cows are milked as a group, rather than having them walk voluntarily to the dairy throughout the day, like most robotic systems.

"The creative thinking is how to design a system that allows New Zealand dairy farmers to use this technology affordably by minimising the number of milking points required. That's likely to require using other technologies like virtual herding to unlock the full benefit. This would also provide a rich data source for providing that transparency of the system," says Paul.

Other complementary ideas are being explored in pilot studies underway at DairyNZ's Scott Farm.

"Often these are not new concepts," explains Paul. "Instead, it's about using them in a different way to what was initially investigated and taking into account whether our operating context has changed.

"For example, one of these is the old idea of having cows spend longer than 24 hours in a paddock, but with fewer larger paddocks. That's something that was investigated in the 1950s, but advances in technology make it an idea worth revisiting."

The big picture...

While the project's focus is on competitiveness, Ruth Prankerd believes there's another important aspect to consider.

"I've flogged myself for 15 years in this sector and worked really hard. So, I'm looking to improve efficiency but

not only that: I want to protect what we've got and not take it for granted, whether that's my family, my people, our community, or the farm and its environment.

"For example, I love to see my farm manager out there with his four-year-old son fishing in the river, enjoying that, having the time to do that, having

About US mega-dairies

In 2022, DairyNZ and Perrin Ag researched United States mega-dairies as the Frontier Farms project's first competitor analysis.

Mega-dairy farms typically run more than 2500 cows, some of which have shown an ability to achieve a high operating profit margin and can scale up and supply the world market. The analysis identified labour efficiency, cost of production and transparency of farm systems as areas where they could have an advantage in the future.

Note: while US mega-dairies operate farms using barn systems, Frontier Farms aims to design systems that improve competitiveness within New Zealand's pasture-based farming model.

After US mega-dairies, the next global competitor to be assessed will be plant and precision-fermented milk alternatives.

dairynz.co.nz/USmega-dairies

1. *Decades of experience: DairyNZ scientists Chris Glassey, Paul Edwards and Jenny Jago with Colin.*
2. *The Hickeys' farming future is right in front of them.*

3. *The Prankerd kids get a buzz out of growing up on the farm.*
4. *Michael and Ruth Prankerd (with Lydia, 10 and Florence, 6) say doing right by their people is also "super important".*



1



2

“

I'm looking to improve efficiency but not only that: I want to protect what we've got and not take it for granted.”



3



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“Doing things like milking using the computer console – all the gaming skills they’ve got will come to the fore.”



About Frontier Farms

This levy-funded project brings together DairyNZ and farmers to design profitable and sustainable farm systems that are ahead of where our leading international competitors will be in 2030. It features:

- global competitor analyses to identify the attributes our future products need to have (US mega-dairies in 21/22, milk alternatives in 22/23)
- co-design of farm systems, to address challenges identified in the competitor analysis
- piloting of promising farm system components during 22/23 and 23/24
- a planned farm-scale Frontier Farm demonstration in 24/25.

Stay up to date with the research progress at dairyNZ.co.nz/frontier-farms

that on our doorstep. I think, 'aren't we lucky' and I want to protect that.

"Southland's a bloody good place to farm. You do have to think about dollars per kilo of production, but it's also about taking everyone on a wider journey and seeing the holistic picture."

...and picture this

Colin says that, just before Christmas 2022, he sat down with Thomas and Mikayla to talk about what their farm might look like in 10 years.

"We think there'll be some on-farm renewable energy, a lot of wearable technology, and probably robots doing tasks somewhere on the farm. The farm will be self-contained to mitigate biosecurity challenges."

Everything they'll do will be directly connected to their customers, says Colin, whether through the internet, social media, or in other ways.

"We also believe our marginal land will be repurposed into other revenue streams. There'll be a high level of

farmer and worker satisfaction, and a lot of autonomy around vehicles, cows, milking, pasture management and calf rearing."

Colin's big wish is to see this project inspiring the next generation, letting them know that farmers and researchers are thinking about them and what their future's going to look like.

"Many farmers do their day-to-day actions and think that sets their destination. I think it should be the other way around: you set your destination and you make your day-to-day actions help you reach that destination.

"By understanding where the future can go, farmers can start adapting their operation now to meet those needs. I hope farmers will look at the Frontier Farms project and go 'this is real cool, this is exactly what we need to do'."



Mikayla and Nicola check one of their farm apps.

Hear more about Frontier Farms in our interview with DairyNZ's Paul Edwards, farm owner Colin Hickey and Perrin Ag managing director Lee Mathieson in *Talking Dairy* episode 46 – dairynz.co.nz/podcast



Research confirms power of plantain

Trial results and farmer experience demonstrate Ecotain plantain's benefits to the environment and milk production.

Rotorua farm owners and plantain advocates Paula and Steve Holdem.

Like many farmers, Rotorua's Steve and Paula Holdem need to meet tough nitrogen (N) loss targets in the coming years.

This meant the couple faced some stark choices – reducing their herd by 200 cows, jeopardising profitability, and potentially reducing their farm team. Steve went searching for a better solution.

Enter Ecotain plantain.

For the past four years, the Holdems have been using plantain on their 730-cow farm overlooking Lake Rotorua.

"We have to reduce N loss by 29% by 2032, and across our catchment the average reduction required is 35%," Steve explains.

Steve and Paula, who own the 270ha (effective) farm with Steve's parents, are now using plantain over 90% of the land, with up to 28% plantain in pastures.

They initially established the plantain by broadcasting 4kg/ha seed with fertiliser. This has been maintained with annual applications of 2kg/ha seed applied with fertiliser.

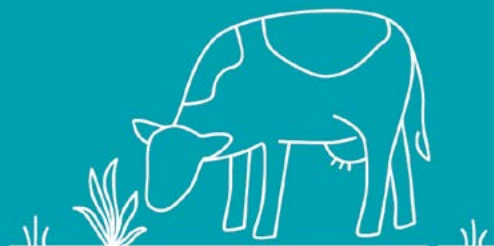
Their N loss in Overseer has reduced by around 14% using plantain, while annual milk production has increased to over 300,000kg milksolids.

"With plantain, we can run 2.7 cows per hectare and meet regional rules around N loss. If we didn't use it, we could only run 1.9 cows. That makes the \$40 per hectare cost of seed a good investment," Steve says.

"We're looking forward to seeing all of plantain's benefits included in Overseer. When that's done, we may be able to increase our stocking rate and achieve our N loss reductions just by using plantain."

Two years of Massey trials found plantain can reduce N loss by 20-60%

30-50% Ecotain plantain was included in pasture



DairyNZ chief executive Tim Mackle (far right) and plantain programme lead Kate Fransen (centre, wearing cap) with research partner representatives.



Trials quantify plantain's benefits

Steve and Paula's experience is backed up by new trial data showing plantain could play a key role in helping other farmers reduce N loss.

Two years of farm trials at Massey University found pastures with 30-50% Ecotain environmental plantain mixed with perennial ryegrass and white clover reduced N losses by 20-60%, compared to a perennial ryegrass/white clover control. There was no difference in milk production between the pasture treatments.

Meanwhile, first-year results from another trial at Lincoln University Research Dairy Farm are showing similar trends in reducing N leaching from plantain pastures. The trial also showed no change to milk production, compared to a perennial ryegrass/clover control.

Trials will continue at Lincoln for another three years, and at Massey for another two years, to provide more data.

There are 21 partner farms – including Steve and Paula Holdem's – using Ecotain plantain as part of the research programme. Partner farms will help develop regionally specific recommendations for establishing and maintaining plantain.

Ecotain environmental plantain from Agricom is being used in trials because it is proven to reduce N leaching.

The research is underway as part of the DairyNZ-led Plantain Potency and Practice programme (see sidebar).

"We hope these trials will give farmers confidence that plantain can help them meet challenging nutrient limits while staying profitable," says DairyNZ's programme lead Kate Fransen.

"Currently, Overseer modelling accounts only for plantain's effect on urinary N. This accounts for a 3-7% N leaching reduction for every 10% plantain in pasture. We know plantain can further reduce N loss by affecting N cycling in soils. Our research will quantify this effect so it can be included in models and farmers can receive credit for plantain's full benefits," she says.

New plantain tools for farmers

As part of the plantain programme, an evaluation system is being developed to assess plantain cultivars' effectiveness for reducing N leaching. DairyNZ is leading this development.

A new Visual Assessment Guide, which helps farmers assess plantain content in mixed pastures, is available at dairynz.co.nz/plantain

DairyNZ is also creating resources to help farmers establish and maintain plantain.

Research aims and funders

The Plantain Potency and Practice programme is a collaborative research initiative aiming to substantially reduce greenhouse gases and the amount of N lost to freshwater by using Ecotain® environmental plantain.

Aside from the results mentioned in this article, the programme found there are no risks to human health from consuming milk from cows grazing plantain, and no negative changes to milk composition. The programme is also assessing animal health effects of grazing plantain.

Funding partners are DairyNZ, the Ministry of Primary Industries (through the Sustainable Food and Fibre Futures Fund), PGG Wrightson Seeds and Fonterra.

Programme delivery partners are Lincoln University, Massey University, Lincoln Agritech, AgResearch, Agricom, Plant & Food Research, and Manaaki Whenua – Landcare Research.

To learn more about using plantain and its benefits, visit dairynz.co.nz/plantain

Scientists in your corner

Meet some of the DairyNZ scientists working for you, from lifting fertility rates to reducing farm injuries.



Dr Callum Eastwood

**SENIOR SCIENTIST
CANTERBURY**

As a social scientist, Callum's fascinated by how farmers and technology interact.

"It's always fun to do the 'science-y part', but it's also nice to provide farmers with things they can use that make what they do easier," says Callum.

"Recently, we worked with farmers to co-design an emerging leaders' course for up-and-coming employees. Using modern methods of learning that fit with farmers, the course is now available through a training provider."

A recent Sprains and Strains project is focusing on reducing injuries over the busy calving period. Callum helped develop an adaptable trailer for safer and easier calf-pickup.

Callum is also one of DairyNZ's most prolific science publishers.

"Publishing and sharing research gives us science credibility. Farmers pay our levy and it's important for them to know they have internationally respected scientists carrying out the research."

✉ Callum.Eastwood@dairynz.co.nz



Dr Claire Phyn

**PRINCIPAL SCIENTIST
WAIKATO**

For 24 years at DairyNZ, Claire has loved using science to help solve real-world problems facing dairy farmers.

She's most proud of the Pillars of a New Dairy System programme.

"We investigated genetics and management solutions to improve dairy cow fertility, health and longevity, and examined transition cow management practices."

Developing a new 'Functional Survival' Breeding Value was also a highlight.

"That's something farmers can use to breed healthier cows that survive longer in the herd."

Claire's also worked on once-a-day milking and extended lactations. She's now leading DairyNZ's Low-N project.

"It's an exciting project, combining different on-farm mitigations to achieve big reductions in nitrogen leaching."

✉ Claire.Phyn@dairynz.co.nz



Dr Dawn Dalley

**SENIOR SCIENTIST
CANTERBURY/SOUTHLAND**

For many southern farmers, Dawn's only a phone call away.

"I like to give them a call too, and have a chat about what we're doing and get their advice," says Dawn. "Farmers have so many innovative ideas."

Raised on a dairy farm, Dawn has studied fodder beet, wintering systems (including research at the Southern Dairy Hub) and once-a-day milking.

"It's great to be able to help farmers find solutions for issues which aren't always easy to solve around wintering, future systems or environmental challenges."

Dawn's particularly proud of that research, including a study on how weather and soil conditions affect cow behaviour.

"It's encouraging to see farmers adopting new management approaches during the colder months, based on that research."

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Find out more about DairyNZ's research and our scientists at dairynz.co.nz/researchteam



Dr Jane Kay

**PRINCIPAL SCIENTIST
WAIKATO**

There's been no 'groundhog day' for Jane in her 24 years at DairyNZ.

Originally a milk composition technician, Jane now leads DairyNZ's Less Methane programme.

"I've also worked on once-a-day milking, responses to supplementary feed, transition cow nutrition, and farm-systems comparisons."

Jane loves mentoring students too, but she says helping farmers solve problems is the best thing.

"Seeing an issue resolved is so rewarding."

The FeedRight programme's just one example, working with farmers and other stakeholders to fill an information gap on cow nutrition.

"We're not here just to do science; we're here to help farmers farm into the future."

✉ Jane.Kay@dairynz.co.nz



Dr Paul Edwards

**SCIENCE LEAD
CANTERBURY**

Paul says two things give him the most job satisfaction.

"The first is presenting the work to farmers. Seeing them understand how they can use that knowledge on-farm, that 'lightbulb moment'."

"The second is gaining credibility through published scientific papers. A huge amount of work is distilled into five pages."

A DairyNZ scholar and with his family dairying in Northland, Paul's headed up DairyNZ's research into flexible milking and MaxT (milking to a maximum time).

"Huge farmer engagement has seen many take up the approach. They say it's given them more confidence, having both scientific research and practical farmer experience in the mix."

Paul also loves delving into how technology can help farmers, and he's leading DairyNZ's latest project, Frontier Farms.

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Dr Wendy Griffiths

**SENIOR SCIENTIST
WAIKATO**

"For me, science is a career where insatiable curiosity is a positive trait."

Wendy's been at the grassroots of DairyNZ's Forage Value Index research, which remains a big part of her current work.

"We want to design forage supply systems that deliver profitable and resilient dairy operations in a changing environment: to see the right plants, in the right place," she says.

Wendy's deferred grazing research has also resulted in strong farmer uptake.

"One said having a long pasture deferral in summer was hugely helpful to simplify their farm system."

"Science is about the challenge of finding a solution that's backed by evidence to help farmers."

✉ Wendy.Griffiths@dairynz.co.nz

Same same, but different?



Is a 'swale' the same thing as a 'critical source area'?
DairyNZ's Justin Kitto explains.

As rules designed to improve water quality outcomes come into force, the terms 'critical source area' and 'swale' are increasingly becoming a part of farmers' vocabulary.

However, these terms are often misunderstood and used interchangeably.

Typically, critical source areas (CSAs) occupy only around 5% to 20% of a farm's total area, depending on topography. However, between 40% and 90% of the sediment and phosphorus lost from the farm comes from CSAs.

A CSA is a part of the landscape where pollutants intersect with water. Saturated soils, rainfall runoff, and pollutants collected around on-farm infrastructure can all contribute to contaminants travelling towards a waterway.

Within a farm, a CSA could be a lane, race or a water trough beside a waterway, yards or off-paddock infrastructure near a waterway, a paddock gate near a waterway – or a swale in a paddock.

What is a swale? It's a depression in the landscape that often has gentle slopes. You might not even notice it until you get rainfall running off the paddock.

Yes, a swale can be a CSA, but only if it connects with a waterway; for example, swales in crop paddocks.

The good news is that farmers can use Freshwater Farm Plans to help identify their CSA risk areas, so they can manage them effectively. Even small actions can make a big difference.

DairyNZ's Pastoral 21 research found small tweaks to farm management resulted in an up-to-90% reduction of phosphorus and sediment in runoff. The tweaks included back-fencing, using portal troughs, and leaving the crop in the swale until the end of the grazing period. In fact, many farmers don't even establish crop in swales these days.

Myth

Critical source areas and swales are the same thing.

BUSTED



Not always: a swale is one of many potential CSAs, and it's only a CSA if its run-off leads into a waterway.



This swale has been pugged by stock after a rain event, which can result in increased sediment losses to water.

New biosecurity tools for farmers



A screenshot of the new interactive map, with the red line representing the farm boundary.

Better resources to help you manage potential biosecurity risks and respond to threats like foot and mouth disease.

An outbreak of foot and mouth disease (FMD) would be devastating for our farming community, but being prepared is our best defence to stamp it out quickly if the disease ever reaches New Zealand.

That's why DairyNZ has been working with partners to develop useful tools to support our farmers to be better prepared for FMD.

DairyNZ senior biosecurity advisor Rachael Evans says the biosecurity response project has been taking a farm systems lens to explore risk pathways, or modes of spread, for FMD.

"The importance of putting farmers and farm systems thinking at the heart of a biosecurity response is a key learning from our experience with *Mycoplasma bovis*," says Rachael.

"This work aims to embed this learning into preparedness plans for foot and mouth disease and other threats. We

also want to ensure our dairy farmers have effective resources, so they're better placed to manage potential biosecurity risks and respond to threats."

An interactive farm map and a checklist are now available to farmers. The map helps you identify the possible risk pathways for FMD on your farm, while the checklist is a simple way to ensure you have the right up-to-date information to be best prepared for a biosecurity response.

DairyNZ biosecurity manager Liz Shackleton says the FMD outbreak in Indonesia last year was a driver for this initiative.

"That was a timely reminder for New Zealand to review our response plans with a farm systems view. It's never been more important to have preparedness plans and tools that are contemporary, practical and inspire people to act, and champion

good on-farm biosecurity practice," says Liz.

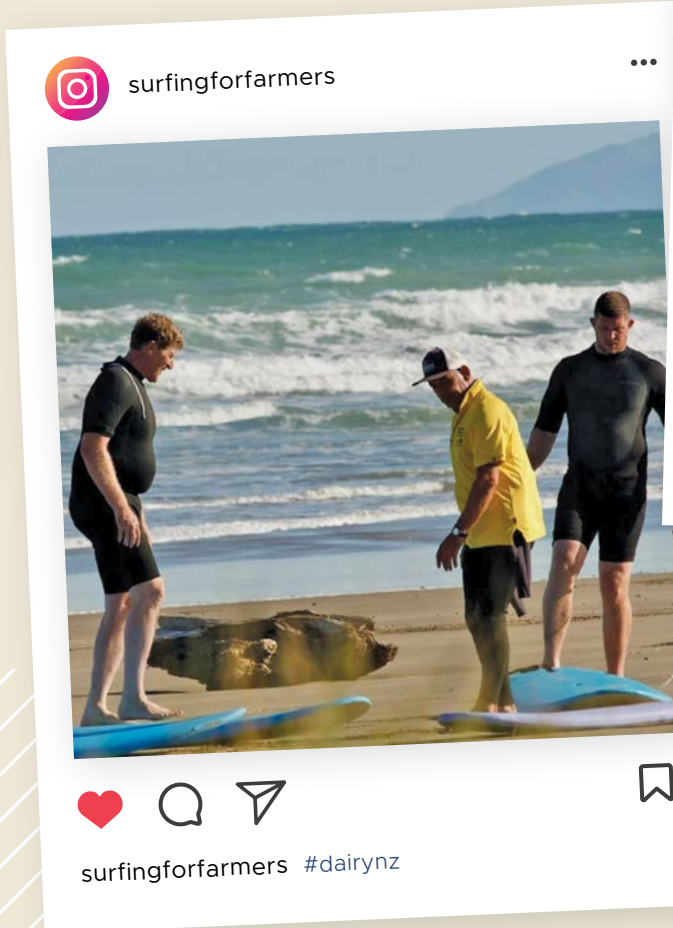
The project team will continue to collaborate with Ministry for Primary Industries (MPI), EpiVets, Beef + Lamb New Zealand and Deer Industry NZ to refine New Zealand's preparedness plans for FMD through a farm systems lens.

An outcome from this will be to ensure farmers are better informed and supported to manage farm restrictions (e.g., stock movement, visitors and cleaning) imposed under the Biosecurity Act 1993 in the event of an outbreak.

Find out what the potential FMD risk pathways might be for your farm using the interactive risk pathway map and checklist at dairynz.co.nz/fmd-map

Snapped on-farm

A handful of dairy farming social media pics that have caught our eye over the past few months. If you'd like your photo to feature, share your snaps by tagging us on social media or using the **#dairynz** hashtag.



Finally, some blue skies over the calving mob, with the scars of recent rains.

Gisborne & Tolaga Bay, that's a wrap for the season. Despite the disruptions from the weather, especially from the cyclone, it was wicked to see so many make it out to North Makorori Beach.



whiteridge_dairyfarm

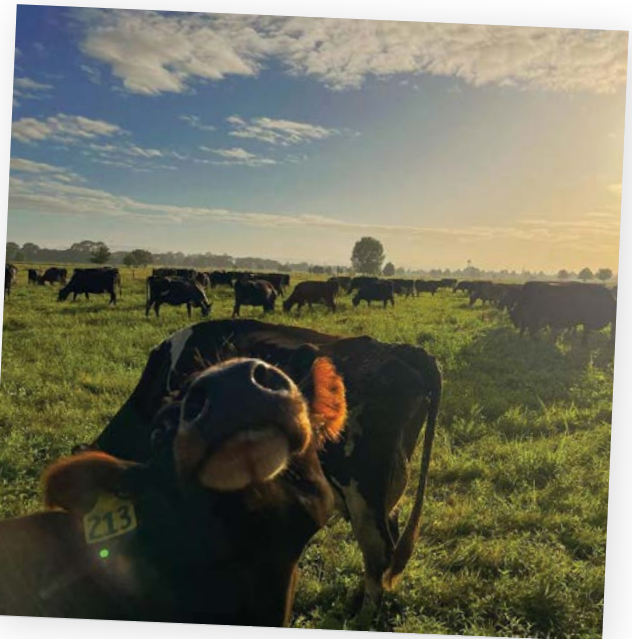


whiteridge_dairyfarm #dairynz

*Lots of silage making around here!
Now we are focusing on giving our staff a much deserved holidays, and on reaching our season's production target.*



_chloemackle



k.whitephotographynz #dairynz

*This heat at the moment is unreal!
So we packed up a picnic and
snuck off into the maize for a few
hours in the shade*



beccas_gram_life_



beccas_gram_life_ #dairynz

*Perks of the job is getting to take breaks
in the most serene places, breath-taking
views, soaking up sunshine, the fresh
air and working with my hubby.
Farm life is where it's at!*

Finding good bulls, faster

Adding genomic information to your animal evaluations can help you make better decisions about your herd, sooner.

The more you know about your animals, the better placed you are to make strong breeding decisions.

Many farmers are using genomic technology to identify animals with the highest potential Breeding Worth (BW) at a younger age.

Genomics provides more accurate data, allowing farmers to breed more efficient cows and make confident decisions about replacements and culling to build their optimum herd.

When you have the genotype information of an animal, you know with accuracy its parentage. The animal's Breeding Values (BVs) are estimated based on its DNA, rather than assumptions. Together, this results in a more accurate BW.

In contrast, with traditional BW, a young animal's BW is calculated using the animal's parentage alone, giving you a lower reliability of BW.

Genomics allows the genetic merit of young bulls to be predicted by analysing their DNA and ancestry.

The key advantage is that you can identify and use younger animals sooner, rather than waiting for an animal to become

What is Genomics?

Genomics is breeding using an animal's DNA to predict an animal's future profitability. It is the study of all an animal's genes. It examines how the genes interact to influence the animal's development and growth. Genomic testing can help predict an animal's BVs for the traits that make up BW.



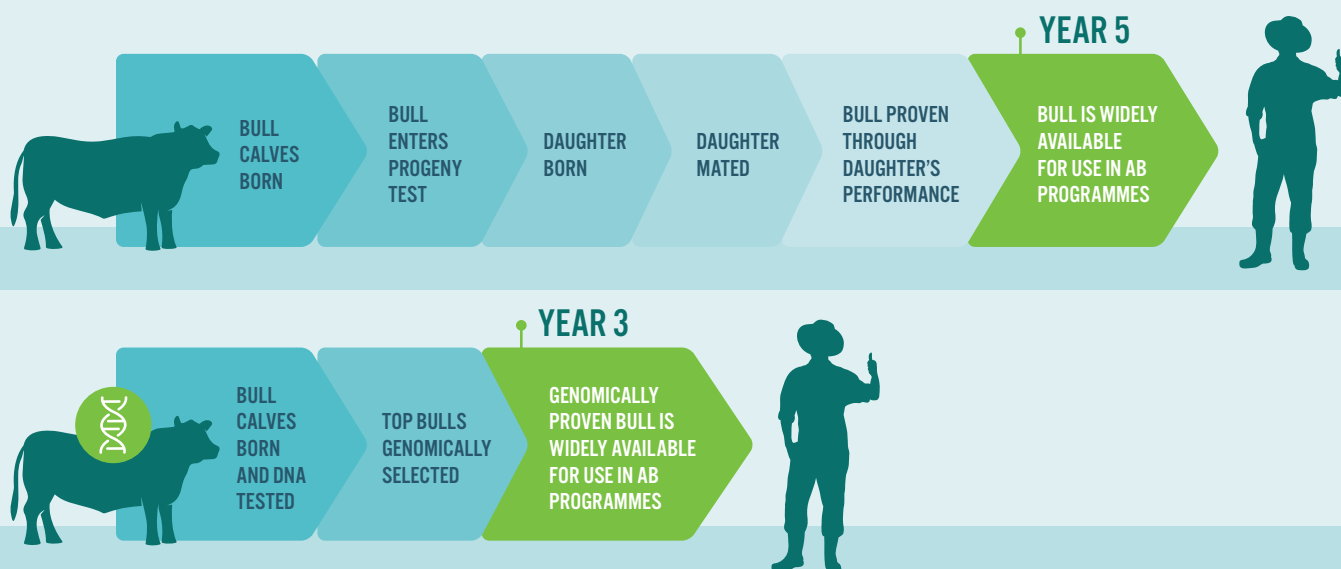
genetically proven through progeny testing, which usually takes four to five years.

Also, with genomics, our sector can evaluate a greater number of bulls because the cost of genotyping an animal is less than a sire-proving scheme, and it's less invasive (just a tissue punch from an ear).

That's what we need: more data. The more farmers we have using genomics, the greater the rates of genetic gain.

Want to obtain genomic information about your herd? Work with providers such as **LIC** and **CRV**.

Genomics finds good bulls sooner



Taking progression seriously

“At work, they call me the ‘staff guy’,” says 23-year-old farm manager Dimarius Wade. “You have to value your staff.”

Dimarius’s people skills were already strong, but he’s taken them up a notch by going through Dairy Training’s* Progression Management course.

“I wasn’t sure about taking the course because I’m a hands-on, outside guy and don’t like being in the classroom. But if you are serious about your personal progression, you have to see these things as an opportunity.”

Dimarius, who farms in Rangitoto, Waitomo District, says the skills he’s gained have put him in a stronger place to support his team.

“Every time we had a good activity in class, I would say to Steve (tutor), ‘I’m going to share this with my team’. After the personality types activity, I came back onto the farm and did these with the guys, and they enjoyed it. It’s interesting to see what kind of person you are and how you think; I really enjoyed that.”

Central North Island dairy farmer Steve Hines tutors the course and says Progression Management teaches skills outside of cows and grass management.

“In particular, it teaches soft skills: how to understand yourself and lead others within your team and community.

““

There were a lot of things I didn’t think I was capable of, but once I went through the course, I realised I was.

“It’s extremely exciting when you see lightbulbs going on in students’ minds as they connect the dots around their workplace experiences. As soon as they understand their own learning style and the style of the people around them, it starts to make a lot more sense.”

The course also covers financial concepts.



Dimarius has improved his already-strong people skills.

“If you have a stable financial base,” says Steve, “with planned expenditure, management of yourself, and a stable environment, from there it’s easy to do a great job for yourself and your employer.”

Dimarius says he now talks to his staff about goals, budgeting and working out how to minimise expenses.

“The course’s personal finance and budgeting days opened my mind to stuff I’d never been exposed to. At work, we get exposed to feed and fertiliser budgeting. The course has really helped me to understand [finances] more.”

Dimarius strongly recommends the course to other farm managers.

“There were a lot of things I didn’t think I was capable of, but once I went through the course, I realised I was. Steve always encouraged me to feel comfortable and I developed significant confidence.”

Progression Management is free and available for all farm managers. Find out more at dairytraining.co.nz/pm

*Dairy Training is a subsidiary of DairyNZ.



Autumn toolbox

Check out these 8 top tools and resources for farming through autumn.



WEB RESOURCE

Autumn pasture management

Monitoring body condition score (BCS), average pasture cover and animal health are all essential for reaching targets for dry-off and planned start of calving.

Find more info about autumn pasture management at dairynz.co.nz/autumn

And get in touch with your DairyNZ extension partner if you'd like a hand planning your autumn targets.



CALCULATOR

Simple Feed Budget

Our calculator can help you with proactive decision-making, especially for an autumn budget through to June 1 or dry-off cover target.

dairynz.co.nz/feed-budgets



WEB RESOURCE

BCS strategies

BCS information contributes to the key decisions during autumn. There are several strategies to get every cow close to her ideal BCS at calving.

Read about them at dairynz.co.nz/bcs-strategies



GUIDE

BCS field guide

Autumn is possibly the most important time to consider whole-herd body condition scoring, and DairyNZ's *Body Condition Scoring Made Easy* field guide will simplify the process.

This handy guide provides objective levels for animal measurement, helping you to achieve accurate and consistent condition scoring.

dairynz.co.nz/bcs-book



GUIDE

Preventing and managing lameness

This guide to lameness on New Zealand dairy farms explains:

- why cows get lame
- the main types of lameness in New Zealand
- how to treat lame cows
- why keeping records can help
- how good stockmanship improves cow flow and reduces lameness
- how to improve tracks and yards.

dairynz.co.nz/lameness



GUIDE

Treating lameness

Get your copy of the *Lameness field guide*, designed to help your farm team:

- identify lameness
- get set up to treat lame cows
- understand foot anatomy and what you're looking at
- identify and treat common hoof problems
- minimise lameness

dairynz.co.nz/lameness



APP

Healthy Hoof app

This app takes the hassle out of recording lame cows.

Easily record lameness information to identify and address the potential risk factors, so you can treat and prevent.

dairynz.co.nz/healthyhoofapp



CHECKLIST & PLAN

Setting up for winter grazing

If you'd like some help with wintering this year, try out these two resources:

A quick checklist to spot any improvements you can make before winter arrives.

A winter grazing plan, which will help you take the right steps to continue lifting wintering standards.

dairynz.co.nz/winter-plans

Keeping watch on farm data

For these two Waikato couples, sharing their data is about sharing the load.

Springdale farm owners Anthony and Kerrie Pollock say “data is king”.

As long-time users of DairyNZ’s Farmwatch, they’ve also been feeding their farm’s information into it since 2019.

Anthony says while some other industries prefer not to give any information away, that’s not the case for dairy farmers.

“Sharing our information doesn’t affect our profit at the end of the year – and it helps everyone make decisions.”

Already doing a weekly farm walk anyway, Kerrie says it only takes her another 10 minutes to update the data into the system.

“The more data you’ve got, the better,” says Anthony. “It puts us on top of the front of the wave instead of being behind it. If you’re behind the wave, you’re always behind the grass growth.”

Farmwatch has really helped Te Poi sharemilker Matthew Zonderop stay on track over the years too, and he and wife Carolyn have also just signed up as contributors.

However, the effects of climate change could see big changes in future Farmwatch figures.

“For example, this wet summer – my staff’s never had that before. Farmwatch will be really valuable in helping us do what we need to do in the years ahead.”

Matthew and Carolyn base their decision-making on the numbers from



Rainfall and topography are of particular interest to the Pollocks, who have a low-lying farm.

their farm and others around Matamata, Te Aroha and Cambridge.

“We particularly follow Owl Farm in Cambridge,” says Matthew. “We’re a System 1 farm and they’re a similar size to us. After tracking them, we know we’re roughly two weeks behind their balance date.”

“

“Sharing our information doesn’t affect our profit at the end of the year — and it helps everyone make decisions.”

While the recent rains might mean there’s more good feed available, Matthew cautions that’s only part of the picture.

“I hope people look at the Farmwatch data to analyse their farm and set up for a good calving season.”

Meanwhile, Anthony’s keen to see the Farmwatch family grow.

“If farmers aren’t yet using Farmwatch data, I’d say, ‘go for it’. The more people providing it and using it, the better it’ll be.”

About DairyNZ’s Farmwatch

An online weekly regional/national summary of the on-farm situation drawn from information provided by contributing farmers. Users can filter by region, farm and system type and view details on things like soil temperature, pasture growth, rainfall, and percentage of cows in milk. There’s also a regional Pasture Growth Forecaster tool, for more accurate feed planning.

Visit dairynz.co.nz/farmwatch



Getting the best from beet

While we already know of fodder beet's strengths as a high-yield, high-energy feed in the dairy system, recent research has revealed its notable environmental benefits. We also know more now about the best ways to minimise fodder beet's nutritional risks.



Dawn Dalley
Senior scientist,
DairyNZ



Roshean Woods
Scientist,
DairyNZ

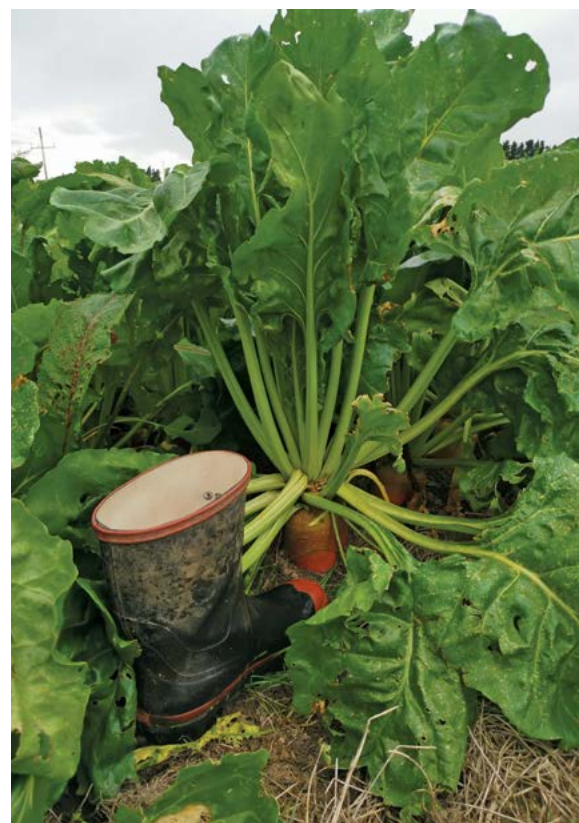
Fodder beet's uptake by NZ dairy farmers, as an alternative to brassicas for wintering and as a lactation supplement, saw exponential growth from 2005 until 2018. Farmers capitalised on the large yields, high utilisation, and flexibility of feeding.

However, the area planted in fodder beet (FB) has since declined, the most common reasons being animal-health-related issues, cost, and management challenges.

It became clear that, as a sector, we needed a better understanding of FB's benefits and risks, and how to manage it for optimal outcomes. And so, DairyNZ and collaborators, with funding from DairyNZ, MPI and PGGW Seeds, have been researching these areas and developing management guidelines for use in NZ systems.

Initial research (2009-2012) focused on the nutritional aspects of FB feeding, while more recent research (2018-2022) has investigated the plant's environmental opportunities. Currently, we're identifying sustainable feeding regimes for optimal production and environmental outcomes.

This article summarises what we know so far, with particular emphasis on FB's environmental opportunities and our recommendations for feeding to minimise nutritional risk.



Environmental opportunities

Until recently, the environmental priority for dairy farmers has been to reduce nitrogen (N) leaching. However, new greenhouse gas reduction targets (Zero Carbon Act) mean farmers are now also looking for ways to reduce methane and nitrous oxide (N₂O) emissions. Our research shows FB could be one tool in the kit.

Nitrate leaching

Fodder beet has low crude protein (CP; less than 12%) but high soluble sugar content (more than 50%). This means it can reduce cows' urinary nitrogen excretion¹ and subsequent N leaching. Research results also suggest urine from cows grazing FB may contain a biological nitrification inhibitor, which offers potential to further reduce N leaching and N₂O emissions².

N leaching from winter-grazed FB (82kg N/ha) at the Southern Dairy Hub was 50% lower than for winter-grazed kale (176kg N/ha)³. After accounting for differences in crop yield, daily feed allocation and the area required for each crop, wintering on FB reduced N leaching by up to 60% compared with kale (Table 1).

Nitrous oxide

Nitrous oxide emissions from urine patches of cows grazing FB in Canterbury were 39% lower than from cows grazing kale, despite both having the same rate of nitrogen deposition (300kg N/ha; Figure 1)⁴. In addition to the proposed presence of biological nitrification inhibitors in urine, researchers have proposed the existence of inhibitors in the soil of FB paddocks, which could reduce N₂O emissions⁵.

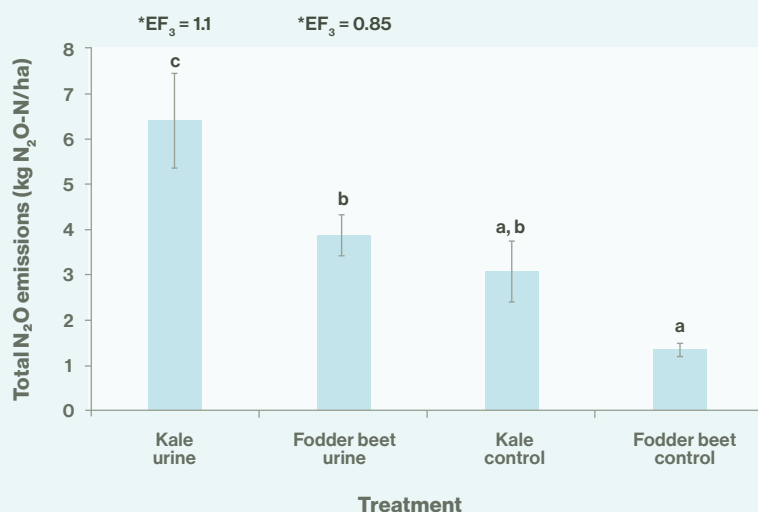
Methane

While dry matter intake is the key driver of methane output, recent research suggests feed type also contributes. Dry cows grazing FB with pasture silage in Canterbury produced 18% less methane (g/day) and had 28% lower methane yield (g/kg dry matter; DM intake) than cows grazing kale with barley straw⁶. Similarly, lactating cows grazing pasture and FB (3kg DM/cow/day) produced 18% less methane and had 16% lower methane intensity (g/kg milk production) than cows fed pasture only, while milk production and methane yield were similar⁶.

Table 1. Nitrogen leaching losses from winter-grazed crops (average of three years' data, AgResearch unpublished).

	Kale	Fodder beet
Nitrogen leached: kg per ha per year	106	55
Nitrogen leached: kg per cow wintered	5.6	2.0

Figure 1. Total N₂O emissions from fodder beet or kale crops treated with urine at 300kg N/ha, compared with a no-urine control.



Note: bars with the same letters are not significantly different. Source: *Di et al. 2016*⁴. *EF₃ – emission factor of livestock excreta.





Minimising nutritional risks

To capitalise on FB's potential environmental benefits, feeding regimes need to minimise the known nutritional risks. This starts with knowing what you're feeding and carefully transitioning animals onto the crop.

Before feeding FB, we recommend you measure crop yield, and feed-test the leaf and bulb separately (from all paddocks) and the supplements you'll offer, to determine the diet nutritional content. With this information, you can determine the most appropriate management to minimise acidosis risk and maximise the likelihood of meeting animal nutrient requirements.

Acidosis

Research shows that feeding lactating dairy cows a diet containing 60% FB with pasture, or dry cows a diet containing 85% FB with barley straw, provides inadequate nutrition. Half of the cows on these diets developed clinical rumen acidosis^{7,8}.

At the Southern Dairy Hub (SDH) in winter 2022, four out of 180 cows developed clinical acidosis during transitioning onto FB. Collar data identified another 26 animals with significantly decreased rumination activity, indicating sub-clinical acidosis. This event highlighted the value of cow wearable technologies (collars, tags, boli) in early detection and management of animal health issues. Sub-clinical acidosis may explain a reduction in milk production when FB was offered as 40% of the diet in late lactation⁹.

Meeting protein and mineral requirements

The nutrient imbalances of FB diets can result in cows having lower blood phosphorus (P), total protein and urea levels than when they're grazing kale¹⁰. This reflects deficiencies in P, protein and fibre. While blood P doesn't reflect the full P status of cows, researchers have observed declining concentrations with time on crop, indicating cows weren't able to maintain blood P levels through metabolism of bone reserves. So, to reduce the risk of P deficiency at calving, and to ensure bone mineral levels aren't depleted, P supplementation for cows is recommended while they're consuming FB¹⁰.

How to lower the risk

Here are the current recommendations for minimising the risk of nutrient imbalances when cows are on FB:

- Test all feeds to determine their nutritional value.

Growing R1 cattle:

- A maximum of 60% FB in the diet DM.
- Supplementation with pasture silage that has adequate CP.
- Supplement calcium (Ca) and P when feeding more than 40% FB.

Dry cows:

- A maximum of 60% FB in the diet DM.
- Supplementation with pasture or cereal silages that have adequate CP.
- Supplement P throughout the dry period, magnesium (Mg) for at least 14 days before calving, and Ca, P and Mg after calving.

Lactating cows:

- A maximum of 30% FB in the diet DM.
- Supplementation with pasture or supplements that have adequate CP.
- Supplement P whenever feeding FB.

Pre-calving management

As cows approach calving, they need more protein to support increased foetal growth and to develop mammary tissue. For cows on FB, this often coincides with a fall in protein intake, as FB has a higher proportion (up to 90%) of low-protein-containing bulbs.

It's important to ensure you're offering sufficient protein in late pregnancy. Either transition cows off FB four weeks pre-calving or offer a higher-protein supplement or pasture alongside the FB.

In-calf dairy cows on low-protein FB crops often 'bag up' closer to calving than those on grass or kale, increasing the risk of calving on crop. Here are some simple ways to reduce this risk:

- Early pregnancy scan to accurately date pregnancies.
- Understand the implications of bull gestation length on expected calving date.
- Don't rely solely on visual appearance of the udder for springer drafting.

Milk production

Currently, there's not enough research to conclude how wintering on FB or supplementing pasture with FB affects milk production and milk composition. Researchers have seen improved milksolids yield among cows wintered on FB, compared with those wintered on kale¹¹. Another study showed no difference in milk production for first-lactation heifers wintered on either FB or kale (Woods, R., submitted).

Recent farm systems research has observed lower peak and whole lactation milksolids production from herds wintered on FB and supplemented with FB in early and late lactation compared with cows wintered on kale and offered 50:50 barley:PKE as their lactation supplement. Varying results relating to FB and milk production may reflect the variation of animal physiological state or nutritional composition of the diet¹².

Fodder beet research continuing

Four years of data coming out of farm systems research at SDH (milk, repro, financial etc.) is currently being analysed to update our knowledge on FB feeding at a systems level. Fodder beet will continue to be included in two of the proposed farm systems starting at SDH in June 2023.

Get more helpful information on fodder beet, including podcasts and our FeedChecker calculator, at dairynz.co.nz/fodderbeet

Key points

1. Fodder beet has potential environmental benefits, with research showing reductions in nitrogen leaching, nitrous oxide emissions and methane production in NZ, but it requires careful management.
2. To minimise the nutritional risks from feeding fodder beet:
 - test crops and supplements for nutritional value, so you know what you're feeding
 - ensure nutrient requirements are being met for all stock, especially in the four weeks prior to calving and for youngstock.
3. Successful feeding requires attention to detail throughout the planning and feeding process. Farmers feeding fodder beet successfully use the following guiding principles:
 - a. **Plan** – paddock selection and setup, feed budgeting, strategies for meeting nutrient requirements and minimising environmental risks.
 - b. **Measure** – crop yield, feed quality, body condition score, animal mineral levels.
 - c. **Observe** – animal health especially during transitioning, growth rates of youngstock.



References

1. Dalley, D. E., B. J. Malcolm, E. Chakwizira, and J. M. de Ruiter. 2017. Range of quality characteristics of New Zealand forages and implications for reducing the nitrogen leaching risk from grazing dairy cows. *New Zealand Journal of Agricultural Research* 60: 319-332.
2. Talbot, W. D., B. J. Malcolm, K. C. Cameron, H. J. Di, and D. Whitehead. 2020. Cattle diet and winter plant growth effects on nitrogen losses from cattle urine patches. *Nutrient Cycling in Agroecosystems* 116: 365-379.
3. Smith, C. and R. Monaghan. 2020. Nitrogen leaching losses from fodder beet and kale crops grazed by dairy cows in southern Southland. *Journal of New Zealand Grasslands* 82: 61-71.
4. Di, H. J., K. C. Cameron, A. Podolyan, G. R. Edwards, C. A. M. de Klein, R. Dynes, and R. Woods. 2016. The potential of using alternative pastures, forage crops and gibberellic acid to mitigate nitrous oxide emissions. *Journal of Soils and Sediments* 16: 2252-2262.
5. Yao, B., H. J. Di, K. C. Cameron, A. Podolyan, J. Shen, and J. He. 2018. Understanding the mechanisms for the lower nitrous oxide emissions from fodder beet urine compared with kale urine from dairy cows. *Journal of Soils and Sediments* 18: 85-93.
6. Jonker, A., D. Scobie, R. Dynes, G. Edwards, C. de Klein, H. Hague, R. McAuliffe, A. Taylor, T. Knight, and G. Waghorn. 2017. Feeding diets with fodder beet decreased methane emissions from dry and lactating dairy cows in grazing systems. *Animal Production Science* 57: 1445-1450.
7. Waghorn, G., N. Law, M. Bryant, D. Pacheco, and D. Dalley. 2019. Digestion and nitrogen excretion by Holstein-Friesian cows in late lactation offered ryegrass-based pasture supplemented with fodder beet. *Animal Production Science* 59: 1261-1270.
8. Waghorn, G., K. Collier, M. Bryant, and D. Dalley. 2018. Feeding fodder beet (*Beta vulgaris* L.) with either barley straw or pasture silage to non-lactating dairy cows. *New Zealand Veterinary Journal* 66: 178-185.
9. Dalley, D., D. Waugh, A. Griffin, C. Higham, J. de Ruiter, and B. Malcolm. 2020. Productivity and environmental implications of fodder beet and maize silage as supplements to pasture for late lactation dairy cows. *New Zealand Journal of Agricultural Research* 63: 145-164.
10. Dalley, D. E., J. P. Edwards, E. Masterson, and R. R. Woods. 2021. The effect of winter fodder beet or kale allocation on behaviour and blood metabolite status of non-lactating dairy cows. *Journal of New Zealand Grasslands* 83: 153-162.
11. Dalley, D. E., J. P. Edwards, and R. R. Woods. 2020. Impact of winter fodder beet or kale allocation on body condition score gain and early lactation performance of dairy cows. *Journal of New Zealand Grasslands* 82: 73-81.
12. Fleming, A. E. 2020. A rumen, animal and farm systems evaluation of fodder beet when used to supplement ryegrass during lactation. Department of Agricultural Sciences, Lincoln University: Canterbury, New Zealand.

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Regional partner	Tony Hutchison	027 808 3292
Senior extension partner	Mark Shadwick	021 287 7057
Extension partner	Hamish Lambeth	027 290 5988
Extension partner	Alex Perrott	027 379 8069
Extension partner	Nicola Blowey	027 1800 4721

Southland/South Otago

Regional leader	Guy Michaels	021 302 034
Regional partner	Stuart Evans	027 393 0114
Regional partner	Darren Smith	027 1800 4717
Regional partner	Kirsty Peake	027 808 3098
Senior extension partner	Nathan Nelson	021 225 6931
Senior extension partner	Nicole Cochrane	021 240 8529
Extension partner	Keely Buckingham	027 524 5890

DairyNZ directors

Jim van der Poel	021 848 484
Chris Lewis	027 289 8942
Colin Glass	027 486 4064
Jacqueline Rowarth	027 694 4334
Tracy Brown	027 291 1716
Mary-Anne Macleod	021 923 332
Margaret Devlin	021 328 200



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