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Autumn 2019



Hill country potential

P8

N tests

P11

New Overseer

P12



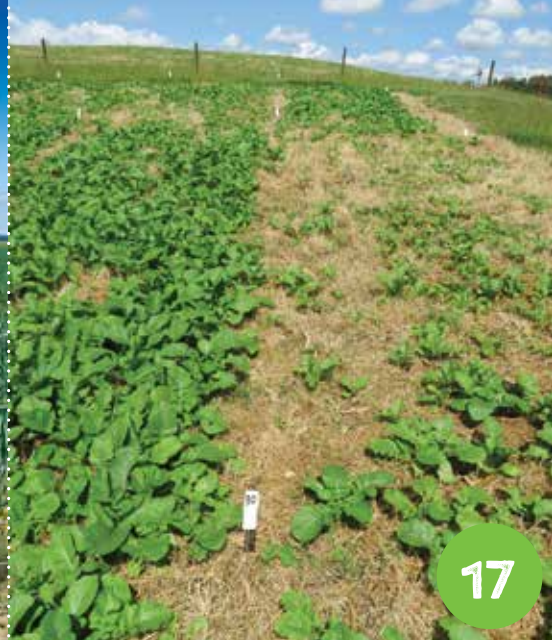
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Balance Agri-Nutrients is one of New Zealand's leading fertiliser manufacturers. A 100 percent farmer-owned co-operative, the company has over 19,000 shareholders and sells around 1.7 million tonnes of product each year, representing a turnover close to \$900 million. Its products include imported and locally manufactured fertilisers, the majority of which attract a rebate for shareholders.

balance.co.nz | 0800 222 090



Since its inception in the 1980s, Super Air has evolved into one of New Zealand's leading agricultural aviation companies. In addition to aerial fertiliser application, Super Air has developed a world-class reputation for aircraft engineering and innovation. Wholly owned by Ballance, Super Air services most of the North Island.

superair.co.nz | 0800 787 372



SealesWinslow is a recognised leader in the production of high-performance compound feeds and feed additives. A fully owned subsidiary of Ballance, SealesWinslow has manufacturing sites located in Morrinsville, Ashburton and Wanganui, and supplies custom-blended pelletised feed to farmers throughout New Zealand. It also provides molasses feed blocks, feed supplements and additives.

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Improve nitrogen efficiency

Plan nitrogen applications more effectively with a new tool.



Ballance has updated and enhanced N-Guru to produce My Pasture Planner, a decision support software tool to improve efficiency of nitrogen use on pastoral farms.

"My Pasture Planner incorporates the expertise of AgResearch scientists, giving you the best nitrogen application solutions, right at your fingertips," says Ballance Precision Agriculture Specialist Ollie Knowles.

"It helps you use nitrogen fertiliser more sustainably, improve financial returns and reduce your environmental footprint. You need total soil nitrogen test (soil Total N test) information to use the software, which identifies where nitrogen will have the biggest impact," says Ollie.

A soil Total N test, done to a depth of 75 mm, determines soil's potential to supply nitrogen for pasture growth. It identifies areas that will be more responsive to nitrogen fertiliser, so nitrogen application rates can be tailored accordingly.

My Pasture Planner helps you explore the possibilities, and check or adjust your nitrogen application rates. "If some areas have low and some have high soil Total N, you can use the same amount of nitrogen fertiliser, but apply more where response is likely to be greater, and less in other areas," says Ollie.

"If all areas have high soil Total N, My Pasture Planner can

help you to predict likely responses, rather than assuming a typical year round average of 10 kg DM/kg N. You can also identify which months give a greater return from nitrogen application, by using soil nitrogen levels combined with built-in pasture growth rate data.

"If all areas have low soil Total N, you can get a better idea of responses, instead of using industry averages. You can improve feed budgeting and economical use of nitrogen fertiliser as a low cost supplementary feed. You can also explore the opportunity to support pasture growth and persistence by increasing your nitrogen application rate."

Farmers can easily access output from My Pasture Planner, as it is integrated with MyBallance, an online secure place to keep farm fertiliser information. "Mapping capability makes it simple to create a 12 month nitrogen plan. The MyBallance integration means you see a fertiliser recommendation mapped out for your farm," Ollie adds.

My Pasture Planner is available exclusively to Ballance Agri-Nutrients customers registered with MyBallance.

Existing Ballance customers can register at myballance.co.nz. To become a Ballance customer contact the Customer Services team on 0800 222090 or email customerservices-mount@ballance.co.nz.





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Mighty MitAgator is here

A powerful new tool to help farmers decide on the best mitigations for contaminant losses has arrived.

After more than 10 years in the making, MitAgator is finally available. It is the first ever tool that singlehandedly deals with all four main contaminants to water: nitrogen, phosphorus, sediment and *E. coli*. It identifies hotspots for each contaminant and then provides mitigation options to reduce losses.

"We are very excited to be able to share MitAgator's might with farmers. We developed it together with AgResearch, so it is an impressively smart tool, incorporating around 30 years of independent research into nutrient and sediment loss and *E. coli* risk," says Ballance Nutrient Dynamics Specialist Jim Risk.

"Because it's so visual, it's easy to understand all the information it brings together. Industry partners, regional council staff and other professionals managing water quality are already very interested in it, and we're expecting a similar reaction from farmers wanting to boost profitability while farming within potential environmental constraints," says Jim.

MitAgator is just one outcome of the Ballance Agri-Nutrients led Clearview Innovations Primary Growth Partnership programme, set up to develop products to increase on-farm productivity and reduce nutrient losses to the environment. The programme was supported by the Ministry for Primary Industries and the Ministry of Business, Employment and Innovation's Clean Water, Productive Land programme, which funded development of the algorithms behind MitAgator.

"Of the 25 product concepts the programme began with, five were picked to develop into products. Three are now available for farmers: MitAgator, My Pasture Planner (see

story on page 3) and Spreadsmart, and another two are currently progressing through development," says Jim. "The five products have an estimated economic benefit of \$220 million by 2025. The products that remained at concept stage are also valuable, providing intellectual property which can be used in the future."

What farmers say about MitAgator

'Farmers can identify their risks in their business, and be able to make informed decision to help farm better in the future'

Kevin van der Poel, Alkemade Dairies, Ohaupo

'I think the strength of MitAgator is that it really paints the picture for you over the whole farm'

Rick Burke, Pukekauri Farms, Katikati

MitAgator: what's under the hood?

Risk maps for more strategic use of mitigations

Farmers will already know some of their critical source areas (main sources of contaminant loss) but others, such as nitrogen loss through leaching or how phosphorus loss varies across the landscape, will be less obvious. MitAgator produces risk maps for each contaminant, which allows for more strategic use of the mitigations. The risk maps show critical source areas, derived from several data sources, Overseer farm management data, a detailed farm map and contour/elevation data with on-the-ground information about soil types, vegetation, other land features and land use.

Powerful algorithms developed from many years of research are behind the risk maps and mitigations.

Cutting edge mitigations and more

MitAgator currently has 24 mitigations built into it. These include some lesser known mitigations that have only recently come to light as result of research, as well as more widely known ones such as fencing waterways and riparian planting. As future research into new mitigations is completed, it's likely more mitigations will be added.

Any existing on-farm mitigations that are yet to be quantified and accounted for in terms of effectiveness can be selected from MitAgator's built-in set of mitigations. This provides information on work already done, which can be used to demonstrate reductions already made.

Test mitigations for a target or vice versa

Scenarios can be tested in either direction. A target can be set and MitAgator will provide information on mitigation options to reach that target. Alternatively, different combinations of mitigation options can be tried out, to see what they achieve. Information on the costs and effectiveness of each mitigation is provided.

Better planning, better spending

MitAgator enables the most efficient spending on mitigations by providing verifiable information about where to spend a mitigation budget. Mitigations can be prioritised by efficiency and cost-effectiveness, helping with planning decisions. MitAgator provides information that can be incorporated into farm plans.

Get started with MitAgator

MitAgator is operated by Ballance's Farm Sustainability Services Team. To get started, you need to have a nutrient budget and a digital farm map. Ballance will provide soil maps, an elevation layer and an aerial image of the farm (which is preferred but not essential).

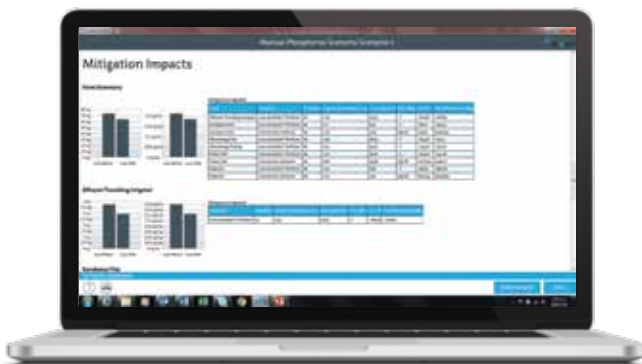
To find out more about the MitAgator service, which includes a property visit right through to a farm plan, email farm.sustainability@ballance.co.nz or phone 0800 222 090.



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An example MitAgator™ risk map



An example MitAgator™ scenario report

More information on MitAgator is available at ballance.co.nz/mitAgator





All in the soil

We talk to Visual Soil Assessment developer Graham Shepherd about his easy-to-use farm management tool.

Visual Soil Assessment (VSA) enables farmers to score their soil and pasture/crop condition by referring to three indicator photos for each soil and plant parameter. Once condition has been assessed, a companion volume of management techniques can be used to help address identified issues.

What prompted you to develop the VSA method?

VSA grew out of a concern that we weren't looking at all facets of soil condition. Generally, the focus is on its chemical composition – the nutrients measured by soil tests. However, your soil's physical and biological condition is equally important and strongly influences how well pasture and crops use those nutrients. Biological condition is especially overlooked. Active soil microbes significantly improve nutrient and water uptake. For example, filamentous white fungi literally hands phosphorous and water to your plants.

I wanted to develop a tool that farmers could use to independently assess the physical and biological condition of soil and plants as a complement to soil tests and make good management decisions. Soil science and agronomy is quite technical but I realised that just by presenting three images showing good, moderate and poor condition, I could simplify a lot of complex science and help farmers come to valuable conclusions about their soil, quickly and easily. It's one thing to assess soil condition and plant performance but what does it imply? That is the role of the VSA.

How has the method evolved over time?

The first edition was published in 2000 and the second in 2009. Make sure you're using the second edition as it has a lot more information about what each indicator can tell you. Recently, I've also developed scorecards with about half the number of indicators, making the process much quicker without compromising the results. Filling out the scorecard is not the ultimate aim. It's about becoming familiar with what you see: getting your eye in.

Do you see it evolving further in future?

Nothing is static and it's important to take new research findings and technology into account. I've had a number of

requests to update the management options in the guides. One day I might have time to produce a third edition!

I definitely see scope for the environmental scorecards to be used more in light of growing interest in greenhouse gas reduction, nutrient emissions and carbon neutral farming. I'm seeing an increasing desire for knowledge from the farming sector about these issues and their drivers.

What benefits does it offer to farmers?

VSA provides farmers with a very quick, simple technique to assess soil and plant condition, which are strong drivers of economic performance. Most importantly, it encourages them to ask questions and find answers to performance issues. If your soil condition is high and pasture or crop is lagging, or vice versa, you need to know the reason and the guides can help with that. VSA is first and foremost a farm management tool.

Have you got any memorable stories about VSA in action?

It's hard to know where to start! At training workshops, I see farmers are prepared to spend quite some time to find that one earthworm required to move their rating up a notch! And they make sure they go back in the hole in one piece! They're very passionate about being able to hand their land on to someone else in good condition.

For more information and VSA guides see:
www.BioAgriNomics.com



*Graham Shepherd,
developer of the Visual Soil
Assessment method.*



The word on the ground

Contractor Greg Muller explains the benefits of no-till farming and his tips for success.



Eleven years ago Greg Muller was managing his family's dairy farm and was "big on cultivation."

"But I saw the pitfalls first hand. We'd spend money cropping a paddock, but the natural drainage was ruined because we'd disturbed the soil and brought a bit of clay to the surface. The good organic matter was buried in the cultivation process. You had a nice new grass paddock that you couldn't graze properly the first winter," says Greg.

After meeting Ballance Forage Specialist and no-till proponent Murray Lane at a field day Greg says "Everything he said made sense. I saw the writing on the wall and thought I'd be a pioneer in the area. When I started people were saying it wouldn't work, so I bought the best machine on the market to make it work."

Today, Greg runs his own direct-drilling contracting business in the Waikato, so has a lot of on the ground experience of no-till.

No-till advantages

Greg says no-till saves times and is less labour intensive. "You can shorten your window from when you last grazed the paddock to getting the next crop growing. Within four to five days you can have the next crop growing. That's a huge saving in time, with less passes of machinery to work in.

"If you're on hungrier, more virgin soils without much organic matter, when you plough it, you tip all that organic matter over and it's lost," says Greg. "In a drought year we managed to double a five year average for turnips. This was on very shallow, very new ground, and no-till saved the organic matter. By cultivating, you risk losing soil. It's not a sustainable practice.

"We no-till into paddocks that may have been cropped previously under cultivation and they're just not the same. What was beautiful organic soil has clay mixed into it and it's not as friable or nice to work. It's not until you're in the field doing it that you realise how much we're ruining soils under cultivation.

"No-till can also conserve moisture in the soil. Cultivating loosens the soil and moisture evaporates out," he adds.

Tips for success

Greg says fertiliser is essential for a good result. "Fertiliser beside the seed enables early root development and speeds up canopy growth, blocking weeds. Normally when you cultivate you get mineralisation (nutrient release) of the soil, so if you're direct drilling you need to fill that gap with fertiliser."

The right machinery is also key for success. "It's important to use a drill that can apply fertiliser, get good depth control and retain moisture. We're lucky now we've got the equipment and technology to handle a no-till seed bed. In the past people didn't no-till because equipment couldn't handle variable soils and micro-contours."

"Pest management is also crucial to make no-till work. It's more challenging in spring with pests. You need to understand the pests and how to manage them. Especially slugs and springtails."

Summing up no-till, Greg says "It's more environmentally friendly, less labour-intensive and you're not burying fertiliser you've put on and organic matter you've grown, never to be seen again."

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No-till cropping leaves the soil undisturbed.

Opportunity in the hills

Sheep and beef farmers can unlock hill country's potential.

During low return years for sheep and beef, many farmers may have opted to mine phosphorus reserves in the soil, or if finances have permitted, replace some or all of the phosphorus used in production. But now sheep and beef returns have picked up, they can consider reinvesting in future profitability.

"While mining phosphorus reserves or applying less than maintenance phosphorus may not initially impact on productivity, in the longer term, the further phosphorus levels move below the optimal range, the more productivity is affected," says Ballance Nutrient Dynamics Specialist Jim Risk.

"Pasture can only grow as much as the most limiting nutrient that it needs allows it to. On many hill country sheep and beef farms, it's very common for pasture growth to be limited by sulphur and by phosphorus," says Jim.

"In fact, evidence indicates that most sheep and beef farms are operating at below optimum phosphorus levels," says Jim. In late 2016 and early 2017, Ballance analysed customer soil test information from over 9000 sheep and beef farm samples taken between 2009 and 2015. The results confirmed what a 2004 AgResearch study for the period 1988 to 2001 had found: sheep and beef farms tended to operate with below optimum phosphorus levels.

"With a bit more in their fertiliser budget, there's an opportunity to raise hill country soil fertility where required to optimum levels and improve pasture. It's one of the most effective ways of increasing longer term profitability," says Jim.

Phosphorus and sulphur are important nutrients for hill country. They are needed to grow clovers so they can fix nitrogen and supply it to the grasses that make up most of the pasture.

"While applying sufficient capital phosphorus increases pasture production soon after application, there is sometimes not a corresponding immediate increase in Olsen P levels. Providing sufficient capital phosphorus has been applied Olsen P can sometimes take two to three years to increase."

Economically optimal Olsen P levels are typically 15-20 on easy hills and 12-15 on steep hill country, and the amount of phosphorus needed to lift levels by one unit depends on the type of soil (see Table 1).

In many situations, phosphate fertiliser gives a better return than lime. On hill country, the ideal soil pH is 5.5. With aerial application of lime, it is seldom economic to apply lime unless soil pH is less than 5.5. If the Olsen P is less than 15 you will typically get a better return from applying phosphorus and sulphur rather than lime.

"If you're going to improve your pasture, you want to make sure you can use it effectively," says Jim.

"This means subdividing paddocks first so you can control stock and graze at the intensity to get the most of your improved pasture. You also need to think about infrastructure like water, so you get even grazing and distribution of dung and urine," says Jim.

"A holistic view is needed, but if returns are better, it might be a good time to invest in infrastructure as well," says Jim.



Soil	Inputs of P (kg/ha) to increase Olsen P by one unit	
	Average	Range
Ash	11	7-18
Pumice	7	4-15
Sedimentary	5	4-7

TABLE 1
Phosphorus needed to increase Olsen P one unit

Beetle in the limelight

A commonly used substance is now in the armoury to combat a destructive pasture pest.



Black beetle can ravage pasture in the upper North Island, and a project that arose from ongoing black beetle problems on many Waikato farms has revealed a practical, effective tool.

Black beetle larvae feed on roots and can severely damage summer pasture. Adults can damage autumn sown pasture, so insecticide-treated seed is needed. The beetles chew through the base of emerging grass plants, killing them. Outbreaks of the pest are encouraged by warmer than average conditions and hot dry summers, and once they occur, populations can stay high for several years.

The recently completed *New tools to combat black beetle* project has found that lime does more than manage soil acidity: it also helps to prevent black beetle outbreaks by reducing larvae populations.

Earlier research had found that ryegrass with black beetle active endophytes on northern North Island dairy farms would keep the insects' numbers down by protecting against adults feeding at the base of the stems. However, nothing was available to deter black beetle larvae from feeding on roots. Farms with light or peat soils, on which the insect can thrive, had no effective form of protection against black beetle larvae. A new tool was needed to combat this.

Involved in the Ministry for Primary Industries Sustainable Farming Fund project was Ballance Forage Specialist Murray Lane, helping to ensure the focus was on a practical solution that could be easily implemented on farm. "Over time we've investigated a number of options. A bacterial bait looks promising but isn't commercially available yet. Lime stands out as it affects the first instar larvae," says Murray.

The project found that applying lime in spring, to maintain pH around 6.0 to 6.2, reduced larval populations by around 30 per cent, compared to untreated pasture. The lime continued to be just as effective over a three year period.

The existing industry recommendation regarding lime application on dairy farms is to target soil pH levels in the range of 5.8 to 6.0. As a result of the project, a target of pH 6.0 to 6.2 is recommended for farms prone to black beetle outbreaks, based on field and laboratory results. "Using lime won't control all black beetle, but by controlling 30 per cent of the larvae, it's another useful tool in the tool box. Plus you get all the other benefits of lime, such as optimal clover content," says Murray.

The *New tools to combat black beetle* project involved farmers from the Waikato Black Beetle Action Group and scientists from AgResearch, and was funded by the Sustainable Farming Fund, Ballance Agri-Nutrients, Dairy NZ and Graymont Lime.

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Black beetle PHOTO: Trevor James, AgResearch



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Use N or lose N

Catch crop trials in Canterbury are showing some encouraging results.

While growing catch crops is nothing new, a Sustainable Farming Fund project is researching new uses of this practice.

Commonly referred to as cover crops, catch crops are already used extensively in cropping. They are traditionally sown in autumn to conserve nutrients over winter, reduce weeds and stabilize soil.

"We've been looking at sowing catch crops in winter, directly after forage grazing, to reduce nitrogen loss and grow valuable winter feed," says Plant & Food Research Scientist Dr Brendon Malcolm, one of the researchers. Livestock grazing on forage crops in winter deposit large quantities of urine-nitrogen onto bare soil, at a time when greater rainfall and reduced uptake of nitrogen by plants can result in more nitrogen leaching.

Encouraging results

Results from trials carried out on two mid-Canterbury dairy winter forage blocks in the project's first year are encouraging. "We found that sowing a catch crop directly after winter forage grazing can reduce the amount of nitrogen at risk of leaching and significantly increase feed production, compared with leaving the soil fallow," says Brendon.

At one site, oats were sown at different times, and using two different sowing techniques. In early July, oats were sown on a kale paddock following grazing, and in early August on a grazed fodder beet paddock. Some plots in both paddocks were cultivated and drilled, and some were direct drilled.

Approximately four months later, the earlier sown oats were hitting 10 tonnes of dry matter per hectare, compared to the approximately 7.5 tonnes of dry matter per hectare of the oats sown a month later. Regardless of timing, the oats that had been cultivated and drilled were doing slightly better than the direct drilled oats.

At another site, the project compared different catch crops species – oats, triticale and Italian ryegrass – all cultivated and drilled. Four months after sowing, the oats, in excess of 7.5 tonnes of dry matter per hectare and not quite ready for harvest, were the most impressive crop. The triticale and Italian ryegrass had 6.4 and 4.4 tonnes of dry matter per hectare respectively, and were ready for harvest as silage.

"Growing these catch crops has captured at least 100 to 200 kg of nitrogen per hectare that could have been lost over late winter and spring before the next crop or pasture was sown," says Brendon.

Next steps

"Following on from the first year's results, we plan to repeat similar trials in Canterbury and Southland, but on different soil types and winters over the next two years," says Brendon.

Once the project is completed, data from it will be incorporated into an Overseer update, so that farmers using catch crops in their winter forage systems get credit for their nitrogen loss reduction.

The project was initiated and led by Dr Peter Carey of Lincoln Agritech, funded by the Ministry of Primary Industries and co-funded by Ballance Agri-Nutrients and others.



Which N test is best?

When it comes to nitrogen tests, there is no 'best.' It depends on your crop and the form of nitrogen you want to measure.

With nitrogen in the soil in different forms, and a number of ways of testing it, you need to work out which test is best for your crop. While all nitrogen tests help to refine nitrogen fertiliser use, there are a few things to consider when deciding which test to use.

Nitrogen in soil takes many forms, only some of which can be used by plants. There are two broad types of nitrogen in soil:

- **Mineral nitrogen** refers to 'readily available' forms plants can use, and includes nitrate and ammonium. Plants use nitrate and ammonium for amino acid and chlorophyll synthesis. This keeps the leaf green, driving plant growth and development. Nitrogen is also used in protein development.
- **Organic nitrogen** cannot be used by plants. Microbes convert organic nitrogen into mineral nitrogen, making it available for plant use. Most organic nitrogen is contained in organic matter in the soil.

Nitrogen tests vary in terms of what they measure and what they are used for.

Total N - now and longer term

As the name suggests, a Total Soil N test measures the total pool of nitrogen in the soil, which includes both mineral and organic forms of nitrogen. It is used only for pasture. Taken at a depth of 75 mm, it provides information on nitrogen available for pasture growth, as well as the potential long term supply of nitrogen.

Total N test results change slowly over time, so, depending on changes in land management, this test may only be needed every five to seven years.

My Pasture Planner, an enhanced version of N-Guru (see story page 3), uses Total N test information from different farm areas to help work out variable rates of nitrogen application. Utilising the Total N test and My Pasture Planner to variably apply nitrogen has been shown to reduce nitrogen loss in OVERSEER® from between 3 and 12 per cent, with an average of 4 per cent.

Available N - just this season

The Available N test measures organic matter that is going to be mineralised during the life of the crop, so only measures the potential supply of available nitrogen for the growing season. Done to a depth of 150 mm, it is used for refining nitrogen applications for forage crops such as brassica, fodder beet and maize. The Available N test is completed before the crop is sown, when regular crop soil testing is done.

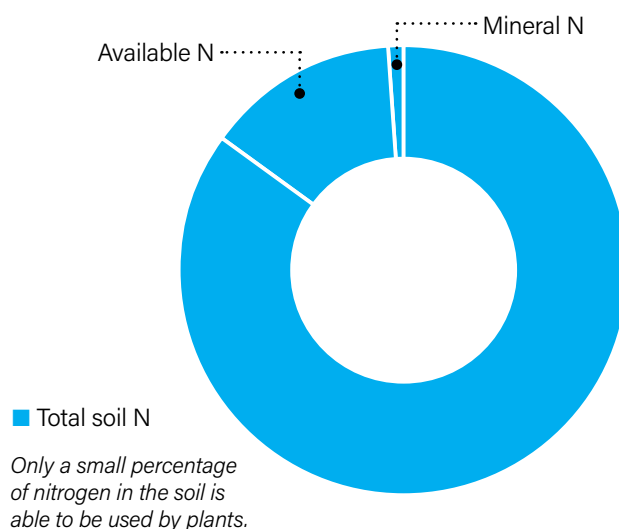
Mineral N - just now

Mineral N tests (or Deep Soil Mineral N tests) measure the nitrogen (ammonium and nitrate) in soil that is

immediately available for plant uptake. Results can inform fertiliser recommendations for cereals and grass seed. It is important the test is taken prior to any fertiliser nitrogen being applied.

A Mineral N test is performed at a depth of 600 mm and used for deep-rooting crops such as cereals. For grass seed the test is only taken to 300 mm.

For autumn sown cereals, the test needs to be taken in early spring before nitrogen is applied and before the crop has a high nitrogen demand (stem elongation). For grass seed, the test needs to be taken prior to closing, or as close to nitrogen application as possible.





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Makeover for Overseer

A major makeover of Overseer means it's easier to use than ever before, giving more time for important conversations.

"OverseerFM, the new update of the world-leading nutrient budgeting tool, is now available, replacing the software we've been using since 2012. It's a totally new user interface, and a raft of other improvements make science even more accessible for farmers," says Ballance Environmental Management Specialist Ian Power.

Ian trains Ballance staff to use Overseer, and has been on Overseer's Science Advisory Group and involved in validation and version testing.

"OverseerFM is easier and more intuitive to use, and its reports easier to understand. It still has the functionality, integrity and science-based approach of the legacy software.

"One significant improvement in the new software is the simpler and quicker way to share farm data, by giving permissions to other users. With everyone working from exactly the same set of information, analyses are more likely to be consistent and reliable. Time and money can be saved, with less of the duplication of effort involved when multiple professionals model the same farm for different purposes," explains Ian.

"Entering data is also easier, so time farmers and consultants previously spent doing that can now be better used, reviewing and discussing the analyses."

The reports present results in more meaningful ways, like showing trends over time, so are also easier to understand.

"Another great improvement is the quick and simple way that soils can be allocated to a management block, which provides a more accurate representation of your farm. You can draw your farm on a map with blocks within it and if your area has been mapped with S-map, use the S-map soil layer to allocate up to three soil types per block. Changing the soil properties is easy but not recommended unless you have

all the correct independently assessed soil data," says Ian. Areas without S-map can still use the fundamental soil layers (FSL) data.

Start using OverseerFM

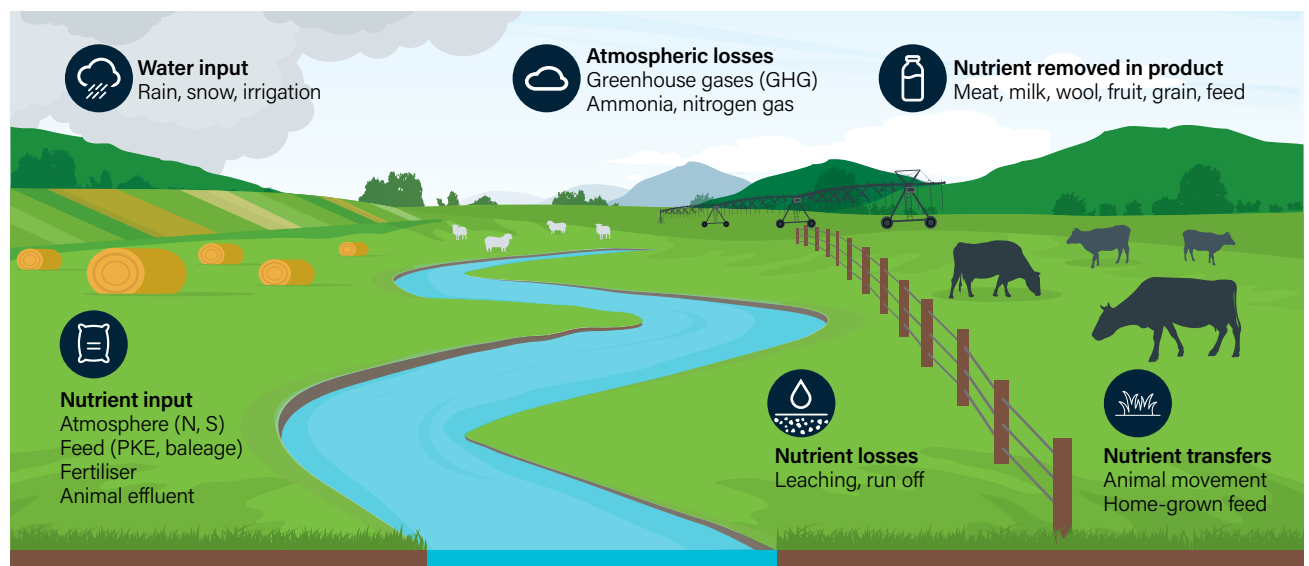
Now is a good time to start using OverseerFM, as the online legacy software will be retired in June 2019.

To use OverseerFM you need to register at fm.overseer.org.nz. You still need to register for OverseerFM even if you are currently using the previous version. All farms using OverseerFM will also need to set up or have someone set up a farm account.

After the legacy software has been turned off files still in the software will no longer be accessible, so you should make sure any such files are working and download them as .xml files before then. Only .xml files from versions 6.2.3 or 6.3.0 of Overseer can be imported into OverseerFM. Note also that .xml files that have DCD, outdoor pigs, fertiliser by form or soil defined by soil series in your farm cannot currently be loaded, although this functionality should be included by the time the legacy software is retired.

From 11 February 2019 OverseerFM farm account subscriptions cost \$200 plus GST per year. The legacy software will remain free to use while still available.

More information on OverseerFM is available at www.Overseer.org.nz. For information on registering and setting up a farm account contact the Ballance Farm Sustainability Services team on farm.sustainability@ballance.co.nz or 0800 222 090.



Deep lime vs. aluminium

Daniel Hendrie's doctoral research seeks to find options for hill and high country farmers dealing with issues related to low pH.



With support from Ballance (via the Fertiliser Association of NZ), Daniel is investigating ways of keeping life – and soil – sweet on hill and high country farms.

Low pH can give rise to high levels of available aluminium, which can affect the growth of pasture plants. Legumes are particularly sensitive, including clover and especially lucerne. "Lucerne is very drought resistant, making it a useful option for dryland farming, if available aluminium isn't an issue," says Daniel.

The key symptom is root damage, which limits the plant's access to moisture and nutrients. In legumes, it affects the plant's ability to develop nodules and fix nitrogen. Depending on where the aluminium is, it can also reduce rooting depth, making plants vulnerable to pulling and drought. The net result is loss of pasture yield and persistence.

Al - how much is too much?

Aluminium becomes toxic to plants at as little as 3 mg of available aluminium per kilogram of soil (3 mg/kg). Levels can vary through the soil profile. "If you have particularly acid soils and you're planning to plant a deep rooting crop, like lucerne, it's important to test deeper than the standard 7.5 cm," says Daniel.

Applying lime to lift pH is the obvious answer but not an instant one. Lime moves very slowly through the soil profile, particularly in dryland environments. Giving it a helping hand by cultivating it in is impractical on many hill and high country soils due to wind erosion, soil stoniness and expense. Plus it does not effectively raise pH below the depth of cultivation, still leaving potential for aluminium to limit rooting depth.

Thinking deep

Daniel's research involved customising a machine to inject lime into the soil, placing it more deeply than standard cultivation allows with minimal disturbance of the soil. The machine placed ultra-fine pelleted lime at 5-10 cm and 20-25 cm below the soil surface.

At the Omarama Station research site, where available aluminium levels ranged between 4.5 and 8 mg/kg down the soil profile, it was used to apply pelleted lime at 0.5, 1.0 and 2.0 t/ha. The machine was also used to cultivate the soil without placing any lime to create a control. These treatments were compared with 1.0 t/ha of surface-applied pelleted lime.

The deep-placed lime significantly increased the growth of lucerne in the second and third years of the experiment compared to the control and surface-applied lime, irrespective of the rate. It significantly increased soil pH and reduced Al levels to below toxic levels at a depth of 20 to 30 cm, whereas the surface-applied lime only managed this in the top 7.5 cm of the soil.

"In the zone between the two lime injection depths there was a band where soil was not effectively limed, so modifications to the machinery or application technique could improve results further," observed Daniel.

Results may be very site specific, depending on soil type, initial soil pH and level of aluminium toxicity, and rainfall, so there's work to do before the tech can be used widely, but it's promising progress on a vexing problem.

Daniel's deep lime injecting drill in action.



Do fertilisers acidify?

Some people think that fertilisers are bad for soil as they make it more acidic. But is it that simple?

"In a lab, adding an acidic substance to something can make it more acidic, but that doesn't mean using fertiliser on land will make soil more acidic," says Ballance Environmental Management Specialist Ian Power.

"For a start, fertiliser can be either slightly alkaline or slightly acidic, so it can reduce acidity or increase it," he says. The more acidic your fertiliser or soil is, the lower the pH, similarly the more alkaline, the higher the pH.

"Most soils in New Zealand are naturally acidic. So if your soil pH is outside the optimum range of 5.8 to 6.0 for pastoral soils, it's actually advantageous to change it. If the pH is too low then some elements, such as nitrogen and phosphorus, become less available to plants and if it is too high some essential micronutrients, like manganese, iron and copper become less available," Ian says.

"The other thing is that a number of factors can change soil pH, including natural processes. In high rainfall environments, leaching slowly acidifies soil over time. Increasing organic matter in the soil decreases its pH. Natural, organic substances such as compost and chicken manure can also affect soil pH," Ian explains.

Amount counts

"To significantly impact soil pH, you'd need to be applying a lot of fertiliser, over many years. Even if you did this, if you were also regularly applying sufficient lime, the soil wouldn't become acidic," explains Ian.

Some fertilisers have little to no effect on soil pH. Fully cured superphosphate is one such fertiliser, with a negligible effect on soil pH at application rates of 500-550 kg/ha/year (see Table 1).

Fertilisers that can affect soil pH, such as DAP, could take 30 to 50 years to increase acidity by 0.1 pH units at the application rate of 250 kg/ha/year.

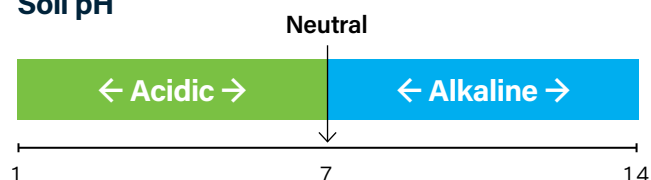
Fertiliser facts

Nitrogen is the main fertiliser nutrient that has the potential to affect soil pH. It can make soils more acidic or alkaline, depending on the type used. The main nitrogen fertilisers used in New Zealand are urea, calcium ammonium nitrate (CAN), diammonium phosphate (DAP) and ammonium sulphate. Ammonium-based products have the greatest potential to acidify soil, while nitrate-based products have the least.

Phosphorus fertilisers are used in lesser amounts and are less acidifying than nitrogen fertilisers. Monoammonium phosphate (MAP), single superphosphate (SSP) and triple superphosphate (TSP) all add phosphorus to soil in a form which has little or no effect on pH in acidic soils, and most New Zealand pastoral soils are naturally acidic. In alkaline soils with a pH greater than 7.2, these fertilisers will have an acidifying effect, so can be helpful in reducing soil pH.

"In short, while some fertilisers have the potential to increase pH, that doesn't mean that they do. You'd need to apply a lot to do this unwittingly. And if you're trying to improve your soil pH, fertiliser can help it on its way," concludes Ian.

Soil pH



Product	Effect on pH	Rate applied	Years required (at typical application rates and no lime applied) to change pH by 0.1 units
Superphosphate (cured)	negligible	555	-
Triple super phosphate	negligible	263	-
DAP	↓	250	30-50 years
RPR	↑	388	4-6 years
Urea	↓	163	20-30 years
Ammonium sulphate	↓	385	4-6 years
Elemental S	↓	83	4-6 years
Gypsum	negligible	313	-
Potassium sulphate	negligible	385	-

TABLE 1

Years required to change pH by 0.1 units

Autumn alert

The risk of nitrate poisoning is greatest when rain or a spell of moist, overcast days follow a drought – making autumn a time to be on your guard.



Nitrate poisoning can happen at any time of year if environmental conditions favour it but autumn is typically a high-risk period if summer has been dry.

Why it happens?

Plant roots stop taking up nitrate from the soil if moisture is scarce. When moisture levels improve, they suck up nitrate rapidly and can accumulate it in stem and leaves. Damage from hail or light frost can affect photosynthesis and also increase nitrate levels. Once elevated, it can take several weeks for nitrate levels to return to normal.

When ruminants eat feed containing high nitrate levels, rumen microbes convert the nitrate to nitrite. Nitrite binds to haemoglobin in the bloodstream, affecting the ability of the red blood cells to carry oxygen.

What happens to stock?

Nitrate poisoning sets in rapidly and has no universally-suitable cure. Affected animals stagger and breathe heavily as their oxygen supply is limited. Chronic nitrate poisoning can cause abortion and poor stock performance, while acute poisoning is usually fatal. The blood of animals killed by nitrate poisoning is typically dark brown.

All ruminants are vulnerable, with young stock more susceptible than older animals.

How can you reduce your risk?

Watching for environmental risk factors and applying appropriate management strategies is your best bet.

- Apply nitrogen in split applications late in the season or use lower rates.
- Apply nitrogen after grazing.
- Pasture nitrate levels are highest overnight and in the morning. Limit stock access to/intake of pasture at these times.

- Minimise pasture intake in the first one to two weeks following drought-breaking rain. Use in-shed feeding, feed pads or laneways, or fenced off areas on pasture to feed out supplementary feed and reduce pasture access.
- Give hungry stock a filling, low-nitrate feed first (e.g. straw or hay) so they are less likely to gorge themselves on risky pastures. Diluting high-nitrate feeds with low-nitrate feeds also helps microbes in the rumen adapt to high nitrate feeds. Adjustment can take three to four weeks.
- Stock lightly, so animals can selectively graze and avoid hard grazing - the lower parts of stems have the highest nitrate content.
- Provide plenty of clean drinking water for stock on high nitrate forage.

Feed facts

- Pasture or feed with nitrate levels around 0.21% or 2,100 parts per million and above pose a risk of nitrate poisoning.
- Stalks are highest in nitrate content, followed by leaves and then grain.
- Cereal green-feeds and vigorous ryegrass (especially annuals) can cause problems with one to two year old pastures posing a greater risk than older pastures.
- Brassicas can have high nitrate levels especially autumn/winter grazed crops.
- Contrary to popular belief, the nitrate content of pasture or crops is not reduced by using glyphosate, chopping or a frost.



K on wheat

Research on wheat in Canterbury provides useful suggestions on how best to apply potassium.

Potassium (K) is a key nutrient required by plants. In wheat, it plays a key role in crop quality, pest and disease tolerance, flowering quality and straw strength.

The amount of potassium in soil depends on the soil type, and most is in a form that cannot be used by plants. Compared to overseas, our young soils generally have higher levels of readily available potassium, but it is also vulnerable to leaching.

Cereals can remove up to 15 kg K/ha per tonne of grain harvested, depending on residue management. Over time, if not replaced, the level of readily available potassium can decline.

Farmers growing wheat in Canterbury, New Zealand's main wheat growing area, know they are removing a lot of potassium from the soil. But they were unsure if maintaining a high level of readily available potassium in the soil would lift their wheat yield and quality.

With rising wheat yields and a lack of recent local data available, Ballance Science Extension Officer Aimee Dawson decided to look into this quandry.

"My research was into the effect of potassium fertiliser on potassium uptake, grain yield and quality in wheat," she says.

Valuable learnings

The Canterbury trial site's soil had low levels of readily available potassium (a QTK of 3) and high levels of non-exchangeable potassium (a TBK of 4.8). Potassium was applied to an irrigated spring sown wheat crop at rates of 0, 50, 100, 200 and 400 kg K/ha, either at sowing or with the first nitrogen side dressing.

As the crop developed, potassium uptake, measured by herbage testing, varied, with potassium content declining after the initial growth period. Potassium applied at sowing had a better effect on potassium content in the herbage compared to potassium applied as a side-dressing. "This suggests that if potassium is required for spring sown wheat, it's best applied at sowing," says Aimee.

Results indicated that overall, potassium application, at any rate or timing, did not significantly affect grain yield, on soil with low levels of readily available and high levels of non-exchangeable potassium.

"It seems that the non-exchangeable potassium was able to meet the crop's demand, which suggests that it's wise to do both a QTK and a TBK test when determining potassium requirements," explains Aimee.

High rates of potassium application (200 kg K/ha and 400 kg K/ha treatments), regardless of when applied, resulted in significant increases in the protein content of wheat grains. This may be due to improved protein synthesis.

"Post-harvest soil test results indicate that if you apply

capital rates of potassium to cereal, it won't luxury uptake, but will leave what it doesn't need in the soil, for the next crop," says Aimee.

"When you're in a situation where potassium is required, utilise muriate of potash (KCl), which is blended with Superten to make the Superten K range for autumn sown wheat, or Cropzeal 16N or YaraMila Actyva S for spring sown," says Aimee.

Dawson AE, Bedford AJ, Hamilton RT, Shand MJ 2018. The effect of potassium fertilisation and timing on potassium uptake, grain yield and grain quality in a spring sown wheat crop. In: Agronomy New Zealand 48, 2018

Potassium tests

Quick-test K (QTK) measures potassium that is readily available to plants.

Sodium tetraphenyl boron test (TBK) measures non-exchangeable potassium, that through weathering over time, can become readily available in small amounts. This potassium store is trapped between layers of clay minerals and is dependent on soil type.



Research site in Canterbury

Ground-helping research

Fertiliser is essential for helicropping success, but how much do you need and what does it do?



Helicropping, or 'aerial no-tillage cropping' allows land of any type to be cropped with small seeded species. It's quick, efficient and, perhaps most importantly of all, by leaving the soil structure intact, the soil is protected and does a better job of growing plants.

Often used on land with low fertility, helicropping can provide stock feed while improving land fertility before new pasture is sown. It is a rapidly developing practice in New Zealand, having evolved from small trials in 2001 to some farmers helicropping 100 ha of forage crops a year.

Ballance Forage Specialist and no-till advocate Murray Lane recently presented a paper at the Agronomy Society conference on the effects of starter fertiliser on a fodder crop sown using helicropping.

"We already knew nitrogen and phosphorus are important for successful cropping, but was it exactly the same for helicropping? Early adopters of helicropping needed better information on the effects of applying varying amounts of nitrogen and phosphorus," says Murray.

In late October 2017, Murray undertook a small plot trial on a low fertility site near Hamilton, with turnip seed sown using shakers to simulate helicropping. Varying amounts of Cropzeal Boron Boost, which contains nitrogen, phosphorus and boron, were also surface sown, at five different rates, replicated eight times.

"Five very dry weeks after sowing, there was no significant difference in the number of plants that had established. This tells us that seeds will germinate, with or without fertiliser," says Murray.

"The dramatic difference at five weeks was in seedling growth. The plots with more Cropzeal Boron Boost starter had less bare ground and significantly more yield and associated canopy closure. When the crop was harvested at the end of January 2018, the plots with the most Cropzeal Boron Boost had the most dry matter yield," he says.

"Higher rates of nitrogen and phosphorus starter fertiliser led to early growth and earlier canopy closure. This meant the plants were able to capture more light, and the denser canopy suppressed the weeds. The seed and soluble fertiliser were broadcast together on the surface.

"Improving our knowledge on fertiliser use helps farmers to be more successful at helicropping. Helicropping offers an opportunity to convert low productivity land into more productive animal finishing crops, such as plantain, chicory and clover as well as brassicas, leading to improved pasture. All of this can be achieved without soil cultivation, effectively protecting our soils," says Murray.

Lane PMS 2018. Helicropping – the role of nitrogen and phosphorus in forage cropping with aerial no-tillage. In: Agronomy New Zealand 48, 2018



Growth five weeks after sowing with and without fertiliser

Fine print

In Ballance's view, there is still no strong evidence to support fine particle application of fertiliser over granular equivalents.

Fine particle application (FPA) involves grinding fertiliser into a powder and mixing it into a suspension or slurry with water, which is then sprayed onto crop or pasture land using special ground or aerial spreading equipment.

"Most of the research has focused on nitrogen, comparing FPA with DAP or Urea/Sustain," says Ballance Nutrient Dynamic Specialist Jim Risk. "We always consider any new research results carefully – and often fund independent studies – so we can be sure we are providing the best advice. Our current position on the issue is that there is no significant response difference between granular fertiliser and FPA, at the same application rate."

The theory is that FPA improves uptake and results in a better response (more dry matter per unit of nutrient applied) than granular formulas. FPA supporters say this is due to more even distribution of the nutrient, enhanced uptake through leaves and reduced losses such as volatilisation or leaching (in the case of nitrogen). However, studies comparing foliar nitrogen and soil-applied nitrogen have found little difference between the two techniques: some trials have found a benefit, some report no difference, while others note yield reductions. Yield reductions are usually a result of leaf damage. Foliar fertilisers can scorch leaves if applied when it is too sunny, or if the nutrient concentration is high.

Lab versus life

"Glasshouse and mini-lysimeter¹ studies are a good starting point for investigating nutrient efficiency but results should always be cross-checked with field trials," says Jim. "Some glasshouse studies have shown positive results for FPA but you can't assume results from a pot will be the same as results in a paddock. Differences in root growth, soil nutrient mobility and plant adaptation can all affect outcomes and need to be further investigated in the field."

Difference versus significance

"When considering research outcomes, it's important to know whether a difference is statistically significant," says Jim. "This can only be determined if the trial is replicated appropriately to deliver repeatable results, which rules out natural background variations. If a comparative field study offers no statistical analysis, you cannot be sure that natural variability has been ruled out."

Research overview

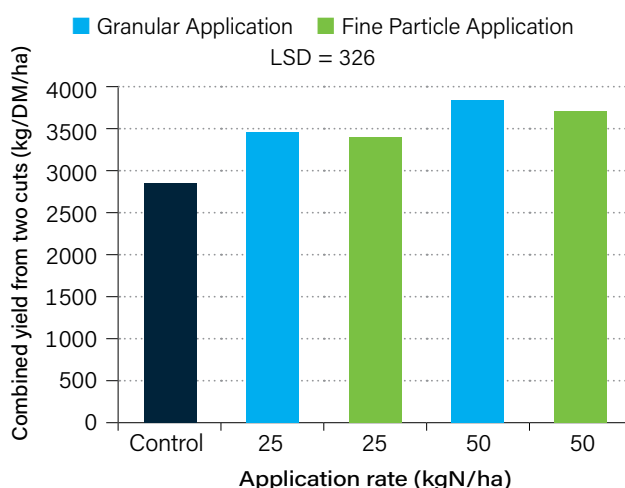
A recent review of all known available research comparing nitrogen in FPA and granular forms² concluded that "Over all the trials reviewed, there is insufficient experimental

evidence to show any agronomic advantage of FPA over a granular fertiliser product."

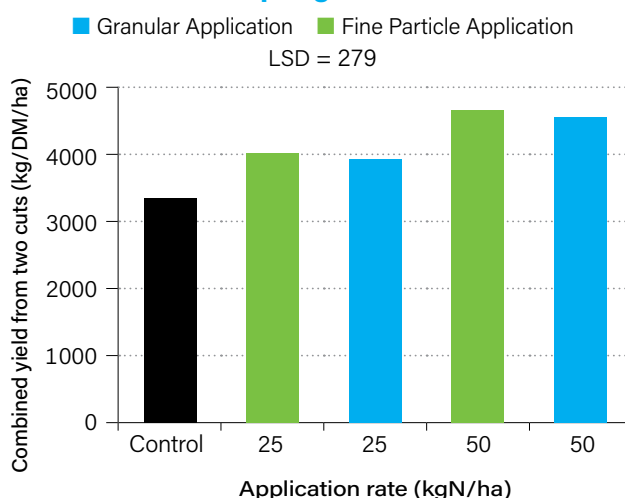
Recent Ballance trial results

Ballance has helped fund some independently run field trials in Southland comparing granular nitrogen application with FPA. Results to date concur with the research review findings regarding lack of significant difference in outcome between forms of application. Graphs show the combined results from two cuts

Autumn 2018



Spring 2017



¹ A lysimeter is essentially a plant pot rigged with measurement devices.

² Jeff Morton, Russell Tillman & Allan Morton (2018): Review of research on pasture yield responses to fine particle application of fertiliser in New Zealand, New Zealand Journal of Agricultural Research.

We got your phosphorus!



Detainment bunds could boost your on-farm toolkit for managing phosphorus loss.

During periods of sudden, heavy rainfall, surface water can carry sediment and phosphorus particles into waterways. Sediment can affect habitats in the receiving waterway and the phosphorus can contribute to the growth of algae and aquatic weeds. "It also means loss of a valuable nutrient from your farm system," says Ballance Environmental Management Specialist Ian Power. "Many farmers are facing regulatory limits on phosphorus loss, so developing or confirming the best tools and strategies to manage losses is really important."

In Rotorua, it's estimated that stormwater runoff causes up to 12 tonnes of phosphorus to end up in Lake Rotorua every year. Research has been underway for some time into the use of detainment bunds to address this issue. In 2013, a Master's project provided 'proof of concept' i.e. that the bunds do actually catch phosphorus.¹

Now the strategy is being tested further with funding support from Ballance, three regional councils and the Sustainable Farming Fund. The research is analysing data from six detainment bund sites and their farming catchments in the Rotorua lakes region. The goal is to quantify just how much phosphorus the structures can capture and confirm how to use them to best effect.

Massey University is providing the lead science supervision with additional support from Waikato and Lincoln University staff. NIWA is also a project partner.

What is a phosphorus detainment bund and how does it work?

A detainment bund is an engineered earth wall, which traps stormwater in a shallow temporary ponding area. A floating decant, riser and (as a last resort) an emergency spillway help manage the water in the ponding area (see Figure 1).

After a while, sediment and phosphorus particles settle and remaining water can be released by pulling a drain plug in the base of the bund. "One thing the current study is looking into is the optimum settling time," says Ian. "You need to hold water long enough to achieve water quality goals but not so long that it affects pasture quality. Two to three days is usually about right."

From a nutrient management perspective, the ponding area may need to be treated differently from other areas of the farm due to the accumulation of phosphorus.

Results to date

Results so far are very promising, showing that the detainment bunds are capable of retaining large amounts of phosphorus – keeping it on your farm and out of waterways. Watch this space, as there will be more to report when the project concludes in 2020.

If you're keen to build now, be sure to check council regulations first or talk to our Farm Sustainability Services team.

Water can leave the ponding area via three outlets in order:

- A **floating decant (1)** is suspended by a pin which is pulled when water rises in the ponding area, allowing the decant to skim off surface water.
- When the ponding area fills to capacity, water flows over the rim of the **concrete riser (2)**.
- An **emergency spillway (3)** allows water to escape if the bund can't manage the volume coming into the ponding area.

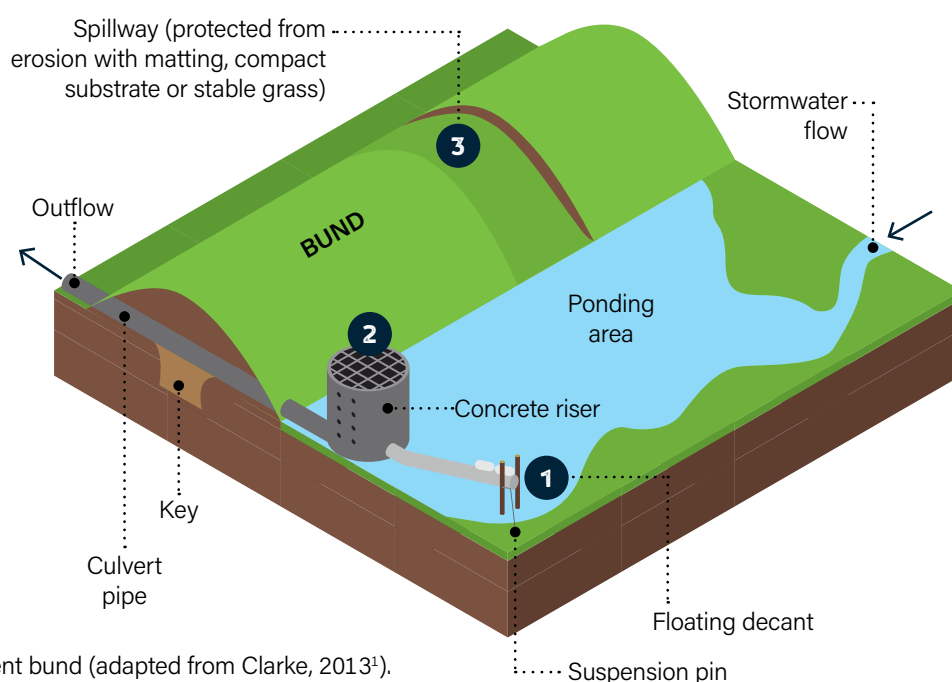


FIGURE 1
Schematic of a typical detainment bund (adapted from Clarke, 2013¹).

¹ Clarke DT, 2013. The performance of Detainment Bunds (DBs) for attenuating phosphorus and sediment loss from pastoral farmland. Unpublished MSc thesis, submitted for examination on 15 March 2013. University of Waikato, Hamilton, New Zealand.

Precision N for pasture

Ballance is supporting innovation through a research project using sensor devices to help apply nitrogen only where it's needed on mixed pasture swards.

Variable rate fertiliser application can help you manage risk and achieve financial benefits. Sensor devices to detect nitrogen levels in plant material and inform targeted nitrogen applications have been available for some time and tested for use on crops, particularly cereal crops. Now, through a farmer-led Ministry of Primary Industries (MPI) Sustainable Farming Fund (SFF) project, we're looking to apply this technology to a pastoral system.

"We first encountered these sensors through our relationship with cropping specialists Yara International," explains Ballance Precision Agriculture Specialist Ollie Knowles. "In the early 2000s, they gave us a tractor-mounted Yara N-Sensor® to test in New Zealand conditions. This sensor has since been superseded but our Nutrient Specialists do have access to a handheld version – the Yara N-Tester – which can be used to quickly assess a crop's N status."

"For the SFF project, we are using another tractor-mounted unit called CropSpec developed by a company called TopCon."

The project to test the tool in a dairy pastoral system started June 2018 and is being managed by Lincoln Agritech with farmers providing guidance on what is important for them. The aim is to calibrate the tool to New Zealand dairy pastures, assess how to best use it and develop step-by-step guidelines for setting it up from the moment it's out of the box right through to using it in the paddock. This information will be made available through infosheets and field days.

"Technology like this really helps support the key principles of best practice fertiliser management: right product, right time, right place and right rate," says Ollie.

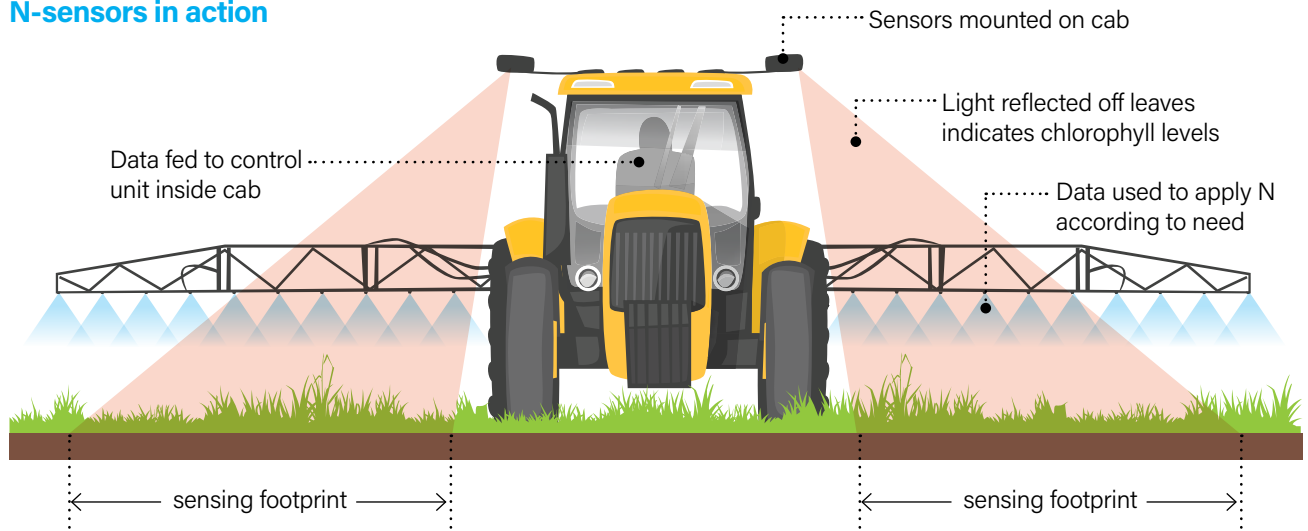
How it works

- Sensors use special lights to measure light reflecting off plant leaves and determine the chlorophyll content. With the tractor-mounted units, sensors are attached to the cab and angled to minimise the impact of shadows and plant movement.
- The amount of chlorophyll indicates how much nitrogen is in the leaf.
- This data is used to build a map of nitrogen levels in the paddock.
- The map is recorded and can be used to apply nitrogen where it is needed, at the rate needed.
- Some devices use calculations that allow the nitrogen to be applied as you go. The data from the sensors feeds into a control unit, which adjusts the flow of nitrogen through the spreader or sprayer.

To see CropSpec in action on YouTube, just type 'TopCon CropSpec Sensors' into the search box.

You can read more about Yara's nitrogen sensors at www.yara.co.nz/crop-nutrition/farmers-toolbox/

N-sensors in action



Act early against eczema



Warm, wet conditions cause facial eczema to thrive – at the cost of your stock.

Facial eczema is caused by the spores of a fungus – *Pithomyces chartarum* – that grows in the layer of litter at the base of pasture. When humidity is high and soil temperatures are above 12°C for a few days, the fungus goes on a rampage of spore production and facial eczema risk rises.

The disease affects sheep, cattle, alpacas, llamas, goats and deer. When animals eat the spores, they release a toxin (sporidesmin), which damages the liver and bile ducts. Clinical signs are swollen, light-sensitive eyes, red scabby skin, shaking and restlessness. However, even sub-clinical cases can severely impact productivity and reproduction.

Strategies to manage risk

Monitor spore counts

- Less than 15,000/g of pasture is low risk. 15,000 to 30,000 is slight risk. Start monitoring farm spore counts when regional counts reach around 20,000. Zinc treatments need to be in place before counts reach 30,000. The moderate risk zone is 30,000 to 60,000 and above 60,000 is high risk.
- ASUREQuality and Gribbles issue weekly reports showing regional spore count trends.
- Most vets offer a farm spore counting service.

Zinc treatments

- Zinc delivered in drinking water, drenches, boluses or pasture sprays offers some protection against facial eczema but it is a preventative, not a cure.
- Zinc levels must be raised before spore counts rise but not too early or there is a risk of stock suffering from too much zinc. Consult your vet for advice.
- SealesWinslow's Zincmax+ product is a good option for

cattle. Stock like its peppermint flavour, which counters the taste of the zinc. It also contains organic copper to help cows maintain healthy copper levels in the run up to winter (cows tend to absorb less copper from their diet when receiving high levels of zinc). Note Zincmax+ is not suitable for sheep or other livestock.

Grazing/pasture management

- Manage grazing to avoid residuals getting low, which increases the chance of stock ingesting litter.
- Make use of shady, south-facing slopes and those facing prevailing, drying winds, as these are safer areas when facial eczema risk is high.
- Supplement the pasture by offering alternative feed and forages to dilute the spores in the diet.
- Don't leave clippings/toppings behind if you top pasture or alternatively, make hay/silage.
- Encourage earthworms as they clean up leaf litter.

Stock genetics and pasture species

- Some animals are more resistant to facial eczema than others. Selective breeding programmes can help build herd resistance.
- Increase the proportion of pasture species that carry low spore counts, such as chicory, plantain and legumes (including white and red clover). Facial eczema risk is higher on grass species like ryegrass, browntop and cocksfoot.

Don't drop your guard

A few cool nights or a bit of rain isn't enough to reduce risk. Spore counts have to drop back into the safe zone before you can relax precautions. Dropping zinc between spikes is not recommended.



Gold-plated service

Ballance's Customer Service team topped the Retail Support Services category in the prestigious CRM Contact Centre Awards.

The award reflects the enthusiasm our talented Customer Service team has for providing an outstanding customer experience. With the win safely tucked under their belt, they can confidently say they are the best in New Zealand in the retail space.

"The awards are judged on the team's ability to resolve an issue in one call and on the consistency of information provided," says Customer Services Manager Sharyn Pearson. Just like when you buy fertiliser – you want to get the job done and you want to be confident in the quality. "The team is really passionate about their work and the awards process. It's a chance to show the value of our work to the rest of the business, as well as our customers."

Ballance has reached the finals four years running, winning in 2016 and again this year. In between, the team was firmly focused on the implementation of MyBallance, and it's testimony to their commitment that they're at the top spot again so quickly after such a major transition.

This year's finalists included supermarket giant Countdown and, in a surprise twist, fellow co-op Ravensdown. It's fair to say a few fingernails met their end in the wait to hear who would take home the trophy!

To get answers to questions about any Ballance product or service – and a sample of top-notch contact centre performance – you can reach the Ballance Customer Service team on 0800 222 090.



Ballance's Customer Service team with their well-earned award.

Copper and deer – a reminder

In Spring 2018 Grow, we reported on research¹ which showed fertilising pasture with 12 kg/ha of copper sulphate (3.0 kg Cu/ha) in autumn is a cost-effective and easy way to increase and maintain the copper status of yearling hinds during gestation and lactation, as well as the copper status of their fawns from birth to weaning. It is also easier and less stressful on stock than direct-to-animal supplementation.

Note that:

- Pasture copper concentrations need to be monitored using herbage tests for three to four months beforehand to determine whether this approach is suitable for your farm.
- You need to keep deer off treated pasture for three to four weeks after application.
- Do not graze sheep on treated pasture as the copper intakes can be toxic.
- Iron intake (from ingesting soil) and high molybdenum and sulphur levels in pasture can interfere with copper uptake, so check these aren't issues.

Spring 2018 Grow is available on the News and Advice/ Our Science section of the Ballance website if you want to refer back to the full article or talk to your Ballance Nutrient Specialist or your vet for more advice.



¹ Grace, N.D. 2002. Effect of the application of copper to pasture in the copper status of grazing weaner, yearling and mature hinds. *Report for New Zealand Fertiliser Manufacturers' Research Association Inc.* AND Smith, L.C. 2004. The effectiveness of autumn spray applications of cobalt sulphate, copper chelate and copper sulphate on Southland pastures. *Proceedings of the New Zealand Grassland Association* 66: 171–176.

New local weather tool

Ballance Agri-Nutrients is proud to offer the most accurate weather forecast available in New Zealand, so you can plan confidently, knowing what the weather is going to do on your farm.

When it comes to planning weather-dependent activities on your farm, it goes without saying that a reliable forecast is priceless.

But most weather forecasts do not take the lie of the land into account. They give you the big picture, but do not tell you what is going to happen weather-wise on your farm.

To fill this information gap, Ballance Agri-Nutrients has partnered with weather forecasting experts NIWA to produce the My Farm Forecaster app.

The app takes topography into account, and provides the best localised high-resolution forecasts available in New Zealand, right down to a scale of 1.5 kilometres. The key to the app's accuracy is NIWA's comprehensive network of weather stations.

My Farm Forecaster is simple and easy to use. To get localised forecasts, for up to six days in advance, all you need to do is drop a pin on the location of your farm. The forecast includes temperature, precipitation (rain and snow), wind speed and direction, humidity, cloud cover and

potential evapotranspiration forecasts for your farm. The app also provides monthly and seasonal climatic outlooks.

My Farm Forecaster works on both Android and Apple systems. It is available exclusively to Ballance Agri-Nutrient customers registered with MyBallance, an online secure place to keep all your fertiliser information.

If you are already a Ballance customer, it's simple to register for MyBallance at myballance.co.nz. To become a Ballance customer and gain access to the great benefits of MyBallance, contact the Customer Services team on 0800 222090 or email customerservices-mount@ballance.co.nz.



ANIMAL



EFFLUENT



PLANT



SOIL

23

GROW

Seasonal climatic outlooks include soil moisture, air temperature and rainfall

Localised forecasts of up to six days include temperature, precipitation wind speed and direction, humidity, cloud cover and evapotranspiration

Drop a pin to get forecasts for your farm



agri-nutrients
Ballance

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For the love of the land

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Farm
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Your land is precious and we want to help you to preserve it for generations to come.

MitAgator is a breakthrough farm environment planning tool for a productive, sustainable future for you and your farm. Built on a detailed farm map, MitAgator's world-leading geo-spatial software offers a comprehensive overview of nitrogen, phosphorus, sediment and E. coli loss on your farm. Recommendations are specific to your farm and your catchment area.

To find out more contact our Farm Sustainability Services team.

ballance.co.nz | 0800 222 090