Ballance agri-nutrients

GROW

NORTH ISLAND
AUTUMN 2018



Microbe power P3

The wedge edge P10

Magnesium magic P15



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Ballance agri-nutrients

Ballance 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.

ballance.co.nz • 0800 222 090

Super Air

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

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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MIGHTY MICROBES

Microorganisms - bacteria, fungi and protozoa – are essential to healthy, productive soil.

They are invisible to the naked eye and yet it's estimated that the top 30 cm of a hectare of soil contains around 10 tonnes of microorganisms or microbes. One gram of soil may contain up to 20 different species.

A thriving microbial community is beneficial for your soil because microbes:

a. decompose organic matter and in the process release nutrients that can be used by plants; and

b. produce substances such as polysaccharides, which help glue soil minerals into larger 'crumbs' (a.k.a. aggregates).

What do microbes need to flourish?

Basically the same things as your plants: air, food and water, plus a safe environment to live in.

Most microbial action takes place in the rhizosphere – the area immediately surrounding plant roots. Strong, healthy plant growth will create more root biomass, providing more places for soil microorganisms to live.

On a pastoral farm animal dung becomes food for soil microorganisms, as does decaying plant matter from crop residues or ungrazed pasture. New Zealand's pastoral soils generally have good levels of organic matter.

Soils with good levels of organic matter are more likely to have good structure, which means their air and water levels will be more favourable for soil organisms. Microbes struggle if soils become waterlogged and/or anaerobic.

To help your soil microorganisms, your soil and your farm thrive:

- Maintain soil in the **optimum pH range**
- Maintain soil nutrients within the optimum range for your farm and soil type
- Return organic matter to the land
- Minimise cultivation
- Avoid pugging and compaction
- Protect topsoil from loss
- Improve drainage (if possible) on land prone to flooding or waterlogging

Can you add microbes to your soil?

Lab and pot trials of microbial inoculants show some promise but replicating results consistently in the field is proving challenging. Currently available products often contain around 1 kg/ha dry weight of microbes. Solutions can contain as little as 1 g/ha. These microbes are introduced into a resident population of approximately 10,000 kg/ha that is likely to be highly resistant to 'invaders'.



Resilient rhizobia

The bacteria genus Rhizobium contains the species responsible for fixing nitrogen in association with clover and other legumes. Rhizobia can survive in soils without host clover for long periods and there can be as many as three million rhizobia in a single teaspoon of soil. Consequently, it is only necessary to use clover seed inoculated with rhizobia if new pasture is sown into undeveloped grassland with no resident clover, scrub or land that has been cropped with maize for more than 10 years.

What about worms?

While not microbes, these invertebrates also contribute to healthy soils.

- Earthworms eat microorganisms along with organic matter but in their gut the organic matter is fragmented and 're-inoculated'. Consequently, there are more microbes present in worm casts than in the organic matter consumed to make them.
- As they move, shred, eat and bury residues, worms mix and aggregate large amounts of soil. They can turn over the top 15 cm of soil in ten to twenty years.
- Worm burrows and activity reduce surface water erosion and increase soil water holding capacity. Deep-dwelling earthworms create permanent, vertical burrows, which can be a major channel for soil drainage, especially in heavy rain. Worms occupying shallower layers create horizontal burrows, which also increase porosity and drainage.
- Worm burrows are lined with readily available nutrients and make it easier for plant roots to penetrate deep into the soil.

STUCK IN THE MUD

Avoiding and repairing damage from pugging and compaction.

Pugging refers to the damage caused by animals trampling wet, soft soil. Plants get torn and buried, reducing the number of tillers. Permeability of the surface is reduced, increasing the potential for runoff. Beneath the surface, soil particles can be compressed together, reducing the movement of air, nutrients and water through the soil, creating barriers to plant root growth and increasing emissions of nitrous oxide – a greenhouse gas. This damage – called compaction – can also be caused by heavy machinery.

Pugging and compaction can have a serious, long-term impact on production. "Affected areas are vulnerable to weeds or less desirable grasses and prone to future damage if the soil structure is not repaired. Even two years after damage, total DM production can be as much as 15-20% lower than previous levels," says Ballance Science Strategy Manager Warwick Catto.

Avoiding damage

- Build pasture cover leading into winter, especially if summer drought has left it worse for wear. Applying autumn N can help.
- Graze wetter paddocks before the wetter parts of the season.
- Graze land that is at risk of pugging with lighter stock.
- Limit grazing time in wet conditions and increase the length of breaks between grazings.
- Winter stock off-farm or consider using stand off pads when soils are wet or waterlogged. As a last resort, use a sacrifice paddock to contain pugging to a small area.
- If feeding out in the paddock, consider putting the feed out before letting the stock in to stop them from following the farm vehicle.
- Keep heavy machinery off paddocks and avoid working soils when soils are wet. It's best to avoid cultivating altogether when re-grassing. Soil takes time to settle down and gets pugged more easily when there is no structure.
- If repeat cultivating, vary the depth annually to stop a plough pan from developing.

Fixing damage

Prevention is definitely preferable to cure but in the event that pastures do suffer pugging or compaction damage, the following strategies may help.

Smudging or harrowing smooths surface roughness but must not be done until the soil is dry to avoid further damage. The process may rip out more plants and re-seeding the harrowed/smudged area may be beneficial.

Rolling the surface flat is another option and has less impact on existing plants. However, it is more effective when the pugged areas are still slightly damp and requires a careful judgement call to avoid further compaction.

Direct drilling seed to undersow existing pasture. This can be difficult if the surface has not been smudged, harrowed or rolled first but is an effective way to deal with large, bare patches.

Full cultivation and re-sowing is time-consuming and expensive but the most likely option to return pasture to a productive state if damage is severe. Do this in spring if conditions permit or in autumn, following a crop.

Subsoiling or ripping is designed to deal with a compacted layer below the surface. The depth of the layer must be determined and equipment chosen accordingly. Again, this is an expensive option and results can be variable.

For help managingpugging risk or restoring pasture after a pugging event, talk to your Ballance Nutrient Specialist



Pugging damage affects pasture growth and productivity.

THE COST OF LOST PHOS

Phosphorus losses from your farm may be small but can have a big impact.

Phosphorus generally enters waterways from soil, dung, effluent or fertiliser being deposited directly into the water or carried into it by surface run off. A very small amount is normally leached from most soil types but with a few (such as sands, podzols and those with low anion storage capacity) the phosphorus losses can be significant.

Phosphorus can encourage the growth of nuisance plants and algae, affecting water quality. "Most of the phosphorus is trapped in sediment but some is dissolved in the water and feeds growth. As water quality worsens, it becomes more alkaline, which 'pulls' more phosphorous out of sediment, accelerating water quality decline," says Ballance Science Strategy Manager Warwick Catto. "What's more, increasing alkalinity makes it more likely that potentially toxic cyanobacteria [blue-green algae] which tolerate a wide pH range will outcompete other plants."

The receiving environment affects how phosphorus-containing sediment behaves. Sediments will settle more readily in a lake, estuary or a slow, meandering waterway, than a fast-flowing river.

Phosphorus loss affects the environment and your farm business

Excess sediment, plant and algal growth in waterways

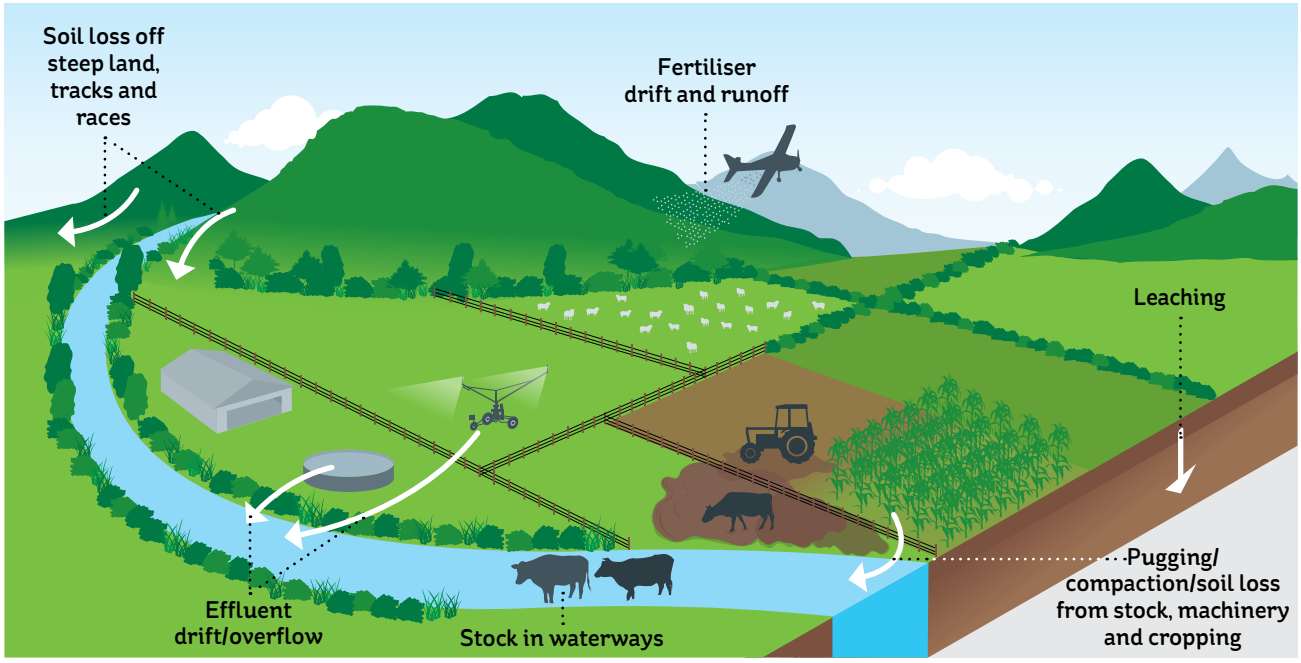
- affects water flow, increasing stream bank erosion and flooding risk
- blocks water intakes and drains
- increases the need for (and cost of) water treatment for drinking/milk cooling
- makes water unsafe for swimming and other recreational activities
- affects the habitat and viability of water life

Loss of soil on your farm also means loss of the value of any nutrients you have put into it. The good news is that because of the way phosphorus behaves, it is much easier to manage than the more elusive nitrogen.

Strategies to minimise phosphorus loss

- Manage P levels well and apply fertiliser accurately.
- Use low-soluble P fertiliser on soils prone to P loss.
- Avoid pugging and compaction to reduce surface run off (see page 4).
- Retire steep, unproductive slopes and stabilise with plantings.
- Keep stock out of waterways.
- Plant riparian margins and wet areas to filter sediment from runoff.
- Ensure effluent irrigators are efficient, well maintained and used on appropriate soils in appropriate conditions.
- Maintain tracks and races.

Soon Ballance customers will have access to MitAgator – a decision support tool, which can help you identify and prioritise mitigation actions for P-loss issues on your farm (see page 22).



PLANT

SOIL

THE DICALCIC DIFFERENCE

How dicalcic phosphate differs from 'standard' superphosphate and where might you use it?

Ballance has a mutually beneficial relationship with Hatuma Dicalcic Phosphate Ltd (Hatuma DP), which provides Ballance customers with quality lime products and assures Hatuma DP of a ready supply of Superten for the manufacture of Hatuma Dicalcic Phosphate®.

Hatuma Dicalcic Phosphate is made by combining and curing superphosphate with lime under specialised conditions. This converts the water-soluble phosphate component in the super (monocalcium phosphate or MCP) into a citric-soluble form, dicalcium phosphate or DCP.

Superphosphate becomes available to plants when it dissolves in soil water. Hatuma Dicalcic Phosphate® is converted into plant available phosphate by soil acids and microbes. The product also offers the pH adjusting properties of lime.

So which product to use?

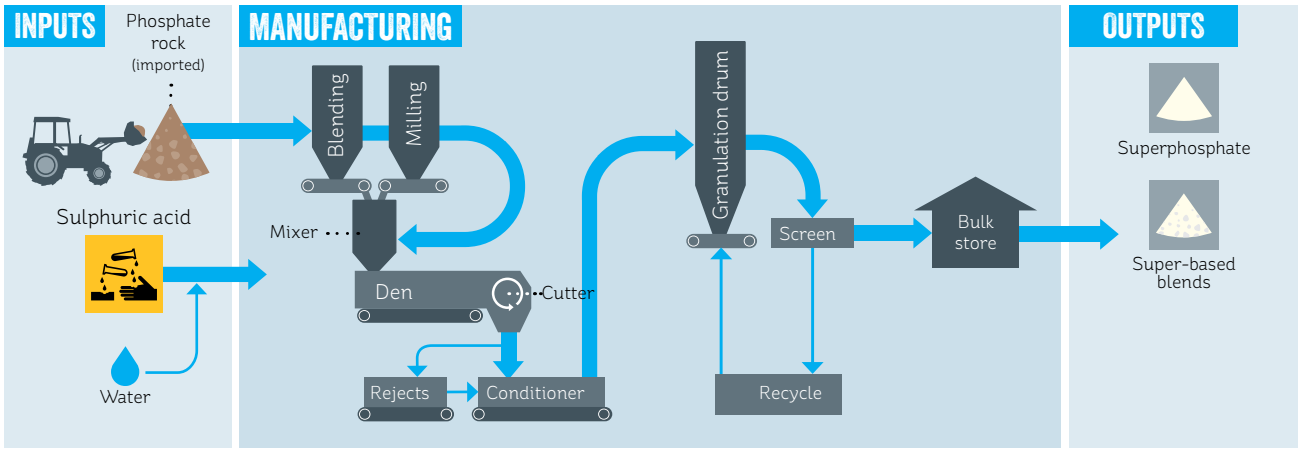
Hatuma Dicalcic Phosphate® allows you to apply lime and phosphate in one application. Superphosphate cannot be mixed with lime as it will cake and clump: the two products have to be applied separately. Hatuma Dicalcic Phosphate® is also safe to mix with seed, as its pH is close to neutral.

Where both lime and phosphorus are needed, applying them together or individually does not appear to influence effectiveness in terms of growth. However, in certain situations using Hatuma Dicalcic Phosphate® may save on application or sowing costs.

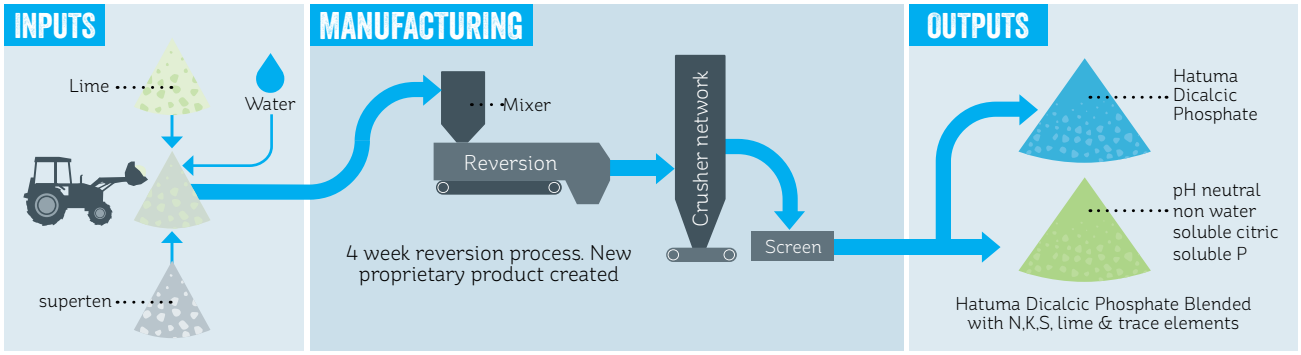
Also consider the potential for phosphorus loss from your farm's soils (see page 5). On sand and podzol soils prone to phosphorus leaching or on steep country with high-rainfall, citric-soluble Hatuma Dicalcic Phosphate® may be a helpful management tool from both an environmental and agronomic perspective. In other situations, it may still have a positive environmental affect but the agronomic impact may not be as high.

For more information talk to your Ballance Nutrient Specialist or go to hatumadp.co.nz.

MAKING SUPERPHOSPHATE



MAKING HATUMA DICALCIC PHOSPHATE®



The above diagram depicts the manufacturing process for preparation. Stocks of Hatuma Dicalcic Phosphate are available and ready for despatch at all Hatuma DP Network sites and selected Ballance Bulk Stores.

LIME TIME?

A look at some of the issues around lime application.

Plants 'breathe' (respire) from every part, including their roots, releasing positively charged hydrogen particles in the process. These exchange for positively charged nutrients on soil binding sites, pushing them into the soil solution where plant roots can take them up.

Microorganisms living on soil organic matter also get and release nutrients by respiring hydrogen (mineralisation).

If the nutrients are not replaced, then the hydrogen content of the soil increases. The soil becomes increasingly acidic. The carbonate in lime 'mops' up hydrogen, converting it to carbon dioxide and water, decreasing soil acidity.

Optimum pH for production

Some crops have highly specific needs (e.g. blueberries like acid conditions) but a pH of 5.8 to 6.2 will suit a wide range of common crops.

On most intensively-farmed, high-producing, ryegrass/clover based pastures, you will achieve optimal pasture growth by maintaining pH at 5.8-6.0 in mineral soils or 5.0-5.5 on peat soils.

As Figure 1 illustrates, you can achieve pasture production increases of 5-10% by applying lime when the pH is below 5.5. Once pH is in the 5.5-6.0 range, responses become small but can be greater depending on if other factors are at play eg low Molybdenum.

Particularly with aerial applications on hill country it is typically only economic to lime when soil pH is less than 5.5. Even then, correcting deficiencies in phosphorus and sulphur may deliver better returns than liming. If the Olsen P is less than 15 you will typically get a better return from applying phosphorus and sulphur than lime.

pH and nutrient availability

A consequence of pH variation is that different nutrients become more or less available at different pH levels (see Figure 2). This can be problematic in relation to micronutrient levels.

Aluminium is a case in point. If pH is less than 5.5, aluminium becomes soluble and potentially plant-available. An exchangeable aluminium level above 3 mg Al/kg is enough to cause problems and 10 mg Al/kg is considered toxic.

Aluminium deforms plant roots and DNA, affecting growth and productivity, particularly in the summer dry. Clover is especially vulnerable. Ballance is currently funding PhD research into this issue (see Spring Grow 2017).

Fine vs. agricultural lime

Does particle size influence the speed at which pH changes. Logically, smaller particles mean greater surface area, which should speed up the reaction. However, there are other factors at play including the quality of the product and the rate at which it is applied. Fine lime is more expensive than agricultural lime, so it can be uneconomic to apply it at the desirable rate. Fine lime also causes safety issues with aerial application. Quality agricultural lime should contain about 80-90% calcium carbonate. It takes one tonne per hectare to raise pH by one unit.

For advice on lime needs and products for your farm talk to your Ballance Nutrient Specialist.

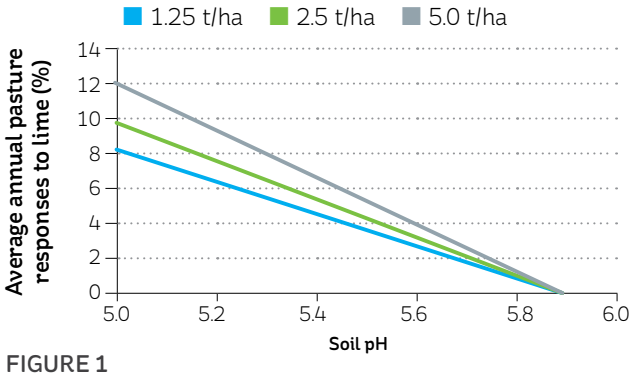


FIGURE 1
Pasture response to lime application

Note: This graph is indicative of typical/expected responses. Lime responses outside these typical responses do sometimes occur.

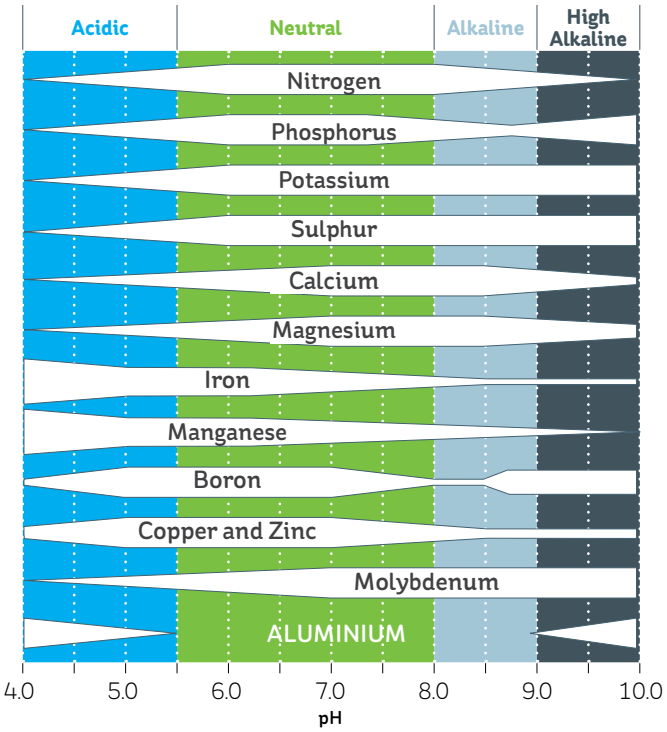


FIGURE 2
pH and nutrient availability

PLANT

SOIL

NURTURING NEW PASTURE

Don't let a lack of sulphur limit the performance of new pasture or added nitrogen.

If you are sowing new pasture this autumn, the final step is to nurture your new grass with light dressings of nitrogen (around 25-35 kg N/ha) after each grazing to promote growth during the first 12 to 18 months while clovers re-establish.

A SustaiN based product is recommended for this purpose as it allows you more flexibility in application timing, particularly during autumn. Autumn can be fickle on the rain front and urea requires that vital 5-10 mm of rain (or irrigation) within eight hours of application to avoid significant losses from ammonia volatilisation. SustaiN can reduce these losses by 50% on average.

The power of SustaiN has been built into a number of other fertiliser products delivering added benefits to growing pasture and crops. Typically, it is combined with some form of sulphur. "Nitrogen is critical for stem and leaf development but it needs to combine with sulphur to form the proteins which influence pasture quality," explains Ballance Science Extension Officer Josh Verhoek. "Sulphur is also a component of chlorophyll, which is essential for plant growth. Plants like to take up nitrogen and sulphur in a 12:1 ratio. If sulphur is lacking you will not be using available nitrogen efficiently, whether from the soil or the bag."

SustaiN Ammo and the PhaSed N range contain nitrogen as SustaiN in combination with sulphur in various forms and ratios to effectively deliver both nutrients in your post-grazing dressings.

"If lack of sulphur is an immediate problem you need to supply it in a readily available form – sulphate sulphur," continues Josh. "SustaiN Ammo is a good option in this situation. If immediate supply is adequate but you want to set your new pasture up well for spring, then PhaSed N may be a better choice."

These products combine SustaiN with fine elemental sulphur. Unlike sulphate sulphur, elemental sulphur is not water-soluble so it does not leach in wet winter conditions. Soil microbes gradually convert elemental sulphur to sulphate sulphur. Microbial activity increases as soil temperatures rise, so the sulphate becomes available as conditions for growth improve and plant demand increases.

To deliver 25-35 kg N/ha you would need to apply:

- 55-75 kg SustaiN/ha; or
- 80- 120 kg SustaiN Ammo 30N/ha (also supplying 11-16 kg sulphate sulphur/ha); or
- 100-140 kg PhaSed N/ha (also supplying 28-40 kg elemental sulphur/ha.

Similar principles apply to boosting autumn growth on established pasture.

As always, use soil testing to determine exactly what your pasture needs.

Pasture Renewal Trust

Ballance is a partner in this organisation, which has gathered some great resources to help farmers score pasture condition, analyse the costs and benefits of renewal and support successful re-grassing. See more at: pasturerenewal.org.nz

For help with soil testing and fertiliser for new pasture, talk to your Ballance Nutrient Specialist.

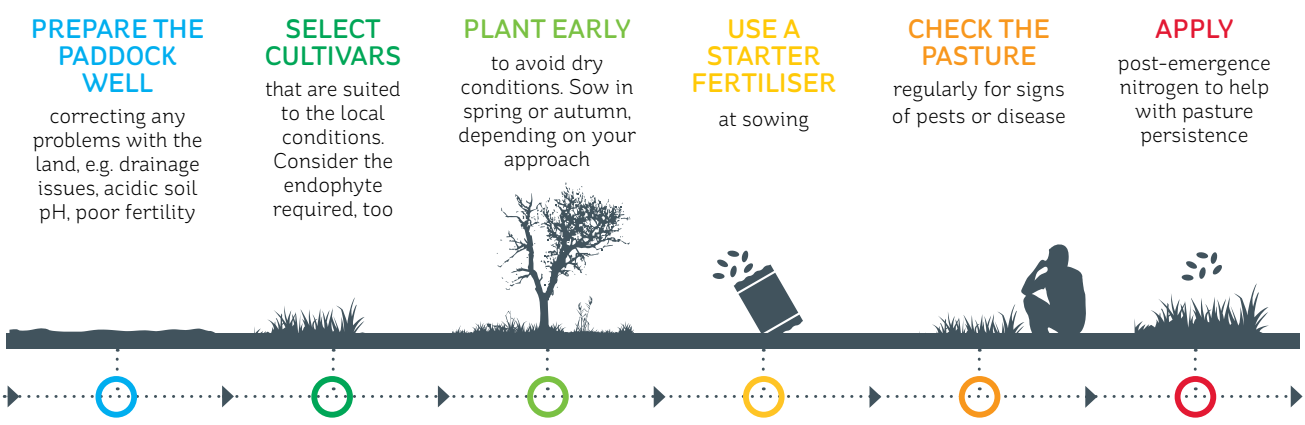


FIGURE 1
Key steps to successful new pasture

EFFLUENT ISSUES

Understand the content and constraints of farm dairy effluent to reap its benefits.

Farm dairy effluent (FDE) is generally a good source of potassium (K) and nitrogen (N) and contains some phosphorus (P) depending on its source and treatment – see Figure 1.

Exact figures depend on herd size, supplement/high-energy feed use, washdown water volume and the season. Testing the nutrient content and understanding application depth helps you gauge the nutritive value of your effluent and calibrate your irrigator.

50 to 70% of the **nitrogen** in FDE is organic N. This takes time to convert into plant-available N. This delay is masked if you have been applying effluent to the same area for a number of years but should be taken into account where you are using FDE for the first time.

FDE's **potassium** content is much more variable than nitrogen or phosphorus but is plant available relatively fast. The high-K, low-P content lends itself to maize production but beware of luxury uptake if soil K levels are already reasonable.

Application

- Do not apply FDE to cold, wet soils. Generally, you need a minimum of two days with less than 15 mm of rain after application[1] to reduce nutrient and *E. coli* runoff and leaching losses[2] (see Figure 2).
- Avoid over application to prevent ponding and runoff and stay within regulatory limits. Most councils now specify a maximum rate of 150 kg N/ha/year from effluent application.
- There are guidelines for distances between FDE application and water bodies/supplies, milk processing areas, property boundaries, dwellings and public areas.
- K build up in soil can impact on animal health. Keep stock off paddocks after effluent application for at least 10 days. Increase your effluent block area if need be to reduce risk.

Storage

Construction or expansion of storage infrastructure is costly and it pays to get it right – too small and you risk overflows and fines. Too large and you are over-investing. Expanding your application area can offset storage needs but only if your climate and soils can support it. Farm scale soil mapping can help confirm which areas on your farm may be suitable for FDE application.

For more information about FDE storage and application on your farm, talk to your Ballance Nutrient Specialist.

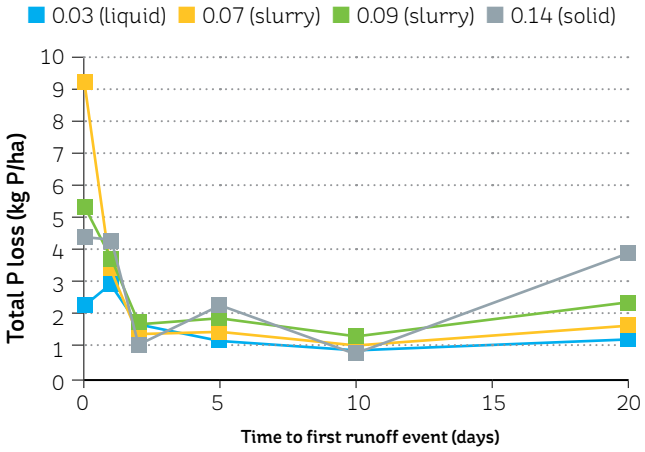


FIGURE 2
Phosphate losses from soils amended with FDE[2]

In Figure 2 above, the increased loss of P at around 20 days is due to its release following breakdown of organic matter. N and *E. coli* followed a similar pattern. Losses of *E. coli* only occurred to day 10.

[1] Optimum time will vary according to soil type, soil saturation level, season etc.

[2] Laurenson, S and Houlbrouke, DJ (2013). Assessing the risk of nutrient and microbial runoff from rainfall following surface application of effluent solids that vary in dry matter content. Report prepared for Dairy NZ Ltd.

	%N	%P	%K
Pond effluent shed effluent	0.025	0.003	0.030
Pond effluent + feed pad solids	0.150	0.030	0.170
Wintering barn/feed pad separated solids	0.480	0.110	0.320
Herd home – slurry	0.330	0.070	0.550
Herd home – separated solids	0.570	0.140	0.740

Based on data collected from 12 dairy systems over a two-year period. (Longhurst, RD, Roberts, AHC, O'Connor, MB, (2000), Farm Dairy Effluent: A review of published data on chemical and physical characteristics in New Zealand. NZ J. Ag. Res,. 43: 7-14.)

FIGURE 1
Approximate NPK fertiliser value of FDE products in 1m^3

ANIMAL

PLANT

THE FEED WEDGE EDGE

Good pasture management is valuable at any time of year but particularly useful when trying to set stock and pasture up to endure winter and thrive in spring.

"Developing a feed wedge can help you keep quality pasture on your paddocks," says Ballance Science Extension Environmental Management Specialist Ian Power. "Quality pasture is green and leafy with minimal seed heads and dead matter. You can't let pasture get too short or too long. Ideally you want to graze plants at the three-leaf stage. This means stock are getting nutritious feed and the pasture will recover quickly."

To build a feed wedge, you need to:

- assess pre-grazing pasture cover on each paddock on a selected day;
- rank paddocks from highest to lowest cover;
- create a target line by joining your pre-cover grazing target at the top end and your post-grazing residual target at the bottom end (see Figure 1).

The quality of your feed wedge as a decision-support tool depends on the quality of the data you collect. Pasture covers need to be estimated and your feed-wedge re-built weekly and ideally all year. The websites of Beef & Lamb New Zealand (beeflambnz.com) and DairyNZ (dairynz.co.nz) offer good advice to make this part of the process easy and effective, along with other useful feed management resources.

"Whether you use a computer program or just pen and paper, being able to see the information as a graph has definite advantages," observes Ian. "It's easy to see things that might not be as obvious from a page full of numbers."



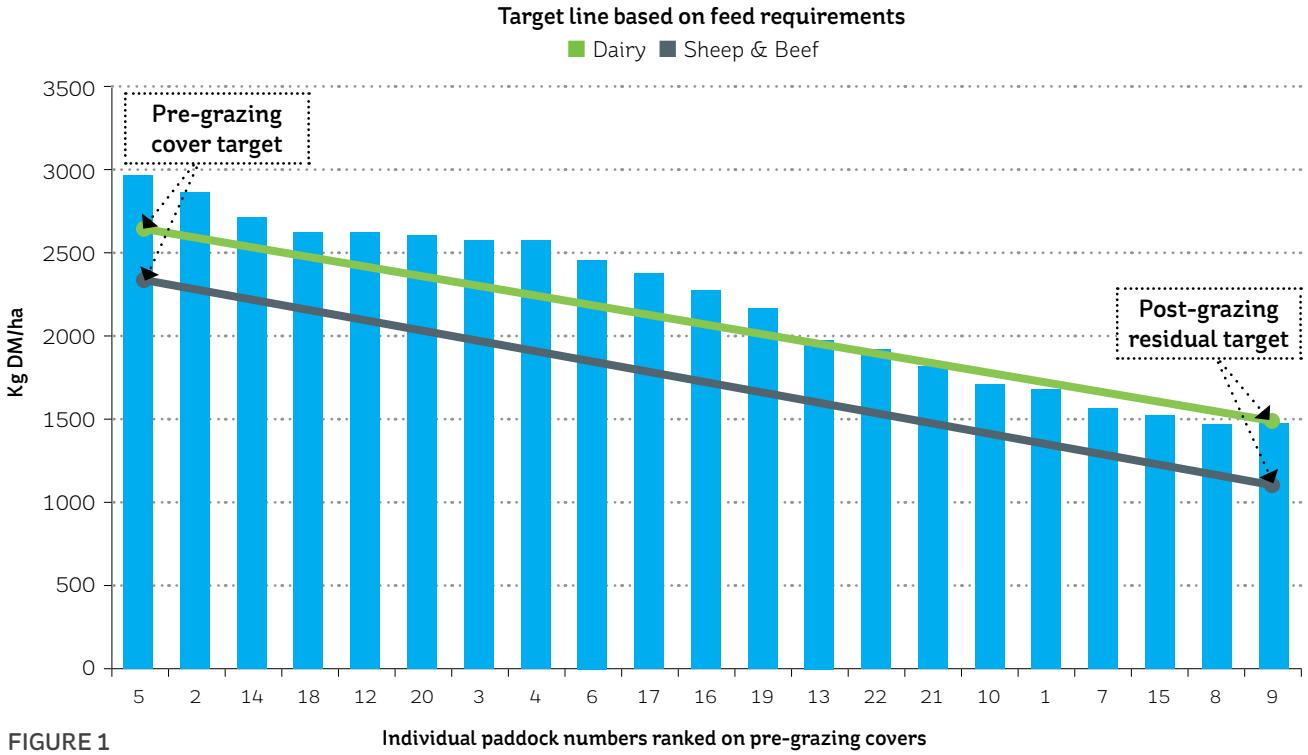


FIGURE 1
An example feed wedge
Image adapted from DairyNZ Farm Fact 'Feed Wedges' (1-14)

A feed wedge can tell you:

- The average pasture cover on your farm.
- Which paddocks to graze and in which order for the next week.
- How many paddocks (and which ones) to take out of the grazing rotation.
- Which paddocks will be in surplus or deficit early so you can plan to conserve pasture from paddocks in surplus or slow the grazing rotation and allow time for paddocks 'below the line' to build cover.
- Whether (and on which paddock) it might be useful to try and boost pasture growth by applying nitrogen (see below) or bring in supplementary feed.

"In general, using a feed wedge can help you make timely decisions and reduce the stress around pasture management," says Ian.

On target

A good post-grazing target leading into winter is 1100-1200 kg DM/ha for sheep and beef farms and 1500-1600 kg DM/ha for dairy farms (although seasonal changes can make these targets difficult to achieve).

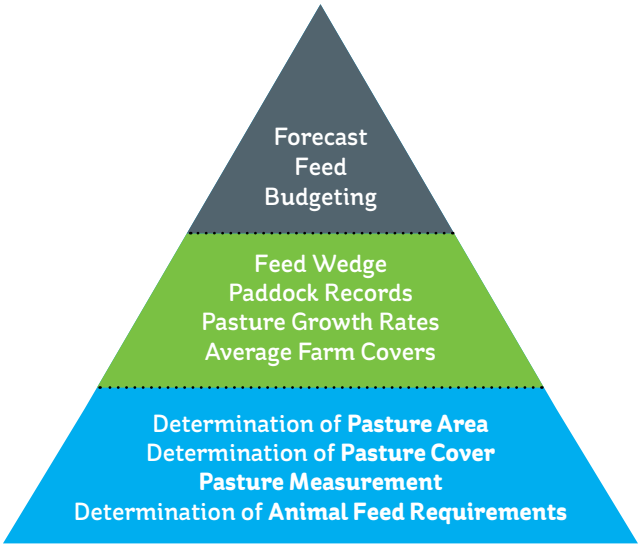
Calculating your pre-grazing cover target is more complex and depends on stock class, intake and rotation length. Using a rotation planner in conjunction with your feed wedge can be useful when you need to vary the rotation length to achieve optimum post-grazing residuals, which is most likely in spring but a possibility in autumn.

Your feed wedge and N-Guru

Once you have developed your feed wedge, you may find you have more paddocks in a deficit situation than desirable. To avoid grazing paddocks too hard (which impacts on both pasture regrowth and stock nutrition) or having to buy in or use valuable/expensive supplement, conditions may support strategic nitrogen use to boost grass growth. "Keep in mind the growth conditions and the impact this will have on pasture response to N," says Ian. "Again, your feed wedge can help you see which paddocks are most likely to respond at the right time to bridge a gap."

Using N-Guru and the total N soil test information from selected deficit paddocks can tell you where you will get your best bang-for-buck from nitrogen fertiliser application. "Remember cooler autumn temperatures or dew or rain before nitrogen application offer no protection from ammonia volatilisation losses," warns Ian. "If 10 mm of rain or irrigation is not guaranteed within eight hours of application, use products containing SustaiN to ensure more of your nitrogen gets into the soil and ultimately grows more pasture."

For more advice on pasture management and N-Guru, talk to your Ballance Nutrient Specialist.



The feed wedge is a key element in your feed and pasture management toolbox.

PRIORITISING N USE WITH N-GURU

Soil tests on a Matamata dairy farm revealed much lower soil Total N levels on two blocks relative to the rest of the farm (as indicated by the yellow blocks).

N-Guru analysis showed that targeting these low-N areas of the farm with higher N rates and reducing N rates on the rest of the farm would increase production returns from additional pasture relative to the same amount of N applied uniformly across the property. This could help to prioritise N application to meet a feed gap.



Low N blocks

Sourced from the LINZ Data Service and licensed for re-use under the Creative Commons Attribution 3.0 New Zealand.

AUTUMN'S CRITICAL CRUNCH

Autumn is a crucial time, to set stock and pasture up well for the next season.

"Going into winter, stock need to be improving or maintaining good body condition scores," says Ballance Science Extension Office Josh Verhoek. "This will make it easier for them to rise to the demands of spring... The challenge is that this is also when pasture growth starts slowing down – or may be recovering after a dry summer - and when you need to be watching your post-grazing residual height to maintain pasture quality and resilience."

Pasture management tools, such as a feed wedge, can really come into their own at this time to help with this tricky balancing act (see page 10).

On the dairy farm

Holding good fat reserves over winter will help cows cope with the massive energy demands on them after calving. Body fat can be mobilised if spring feed doesn't supply enough energy (although you don't want the cow to have to do this too much as it can affect liver function).

"As cows dry off, it's important to keep the rumen large, so that it still has the capacity for large DM intakes come spring," says Josh. Combining low ME feed (such as hay) with a smaller volume of high ME, protein rich feed from pasture can achieve this and also help with pasture management. Be aware that some winter forage crops (e.g. swede) can be lower in protein and may need to be supplemented with silage. Watch for other nutrient deficiencies too – magnesium often needs to be supplemented through winter and phosphorus (as DCP) for stock feeding on fodder beet.

On the sheep and beef farm

In the case of ewes, good body weight going into mating has been shown to increase the chance of multiples. Barrenness increases markedly if ewe liveweight drops below 45 kg. Dividing your flock according to BCS will allow you to target feed to best effect.

"It may be more profitable to focus on improving BCS of ewes on the 'borderlines' to reduce the number of dry ewes and increase the number of multiples," says Josh. A BCS of 3 and above should be the target, which flows on to increase milk production from the ewe and higher lamb liveweight gains. Remember, it takes six weeks pre-mating to gain one body condition score, and you could expect a return on feed of 45 cents/kgDM.

For cattle, the same principles apply. Better-conditioned cows will have larger calves at birth, more milk production and higher liveweight gains in offspring.

Autumn N

Getting feed into the system in autumn means you only have to worry about holding it through winter rather than struggling for weight gains when grass growth is minimal. Strategic use of nitrogen fertiliser can be useful. Use of N-Guru can help refine your strategy (see page 11).

Provided soil temperatures are above 6°C you can get a good response. SustaiN is a good option to accommodate fickle autumn rainfall or use PhaSedN if sulphur is a limiting factor. PhaSedN combines SustaiN with elemental S, which is better at enduring wet winter conditions than soluble sulphate S.

For more advice on autumn feed and pasture management, talk to your Ballance Nutrient Specialist.



ON GUARD

Simple strategies to reduce the risk of nitrate and fluoride poisoning.

Fluorosis poisoning

Fluoride occurs naturally in soil. It tends to stay in topsoil rather than slowly move down the soil profile over time. Fluoride is found in phosphate rocks and consequently in fertiliser.

Acute fluorosis happens when stock ingest a high level of fluoride in a short time. It is most commonly seen when P-fertiliser is applied to pastures over the top of set-stocked ewes in the lead up to lambing and the weeks following. The combination of high feed demand and low pasture covers results in hard grazing, increasing the chance of animals eating fertiliser caught in plant stems or thatch.

Chronic fluorosis occurs when stock ingest lower levels over a longer period, perhaps from eating soil while grazing low levels of pasture or bulb crops on land fertilised with high levels of phosphate (e.g. 40-50 kg/ha/year) for many years.

To minimise acute fluorosis risk from fertiliser ingestion

- Avoid applying phosphate fertilisers over the top of grazing stock.
- Wait for 21 days or 25 mm of rain and check that foliage is free of residues before returning stock to paddocks after applying phosphate fertiliser.
- Don't apply fertiliser to dewy pastures or immediately after rain when fertiliser is more likely to stick to leaves.
- Choose fertilisers with lower levels of fluoride per kilogram of phosphorus.

To minimise chronic fluorosis risk from soil ingestion

- Limit soil ingestion through use of stem crops (such as kale) for winter feed rather than bulb crops (such as swede) or managing the degree of soil ingestion on bulb crops.
- Build pasture cover ahead of winter or use supplementary feeds to avoid hard-grazing and minimise the amount of soil stock eat.

Nitrate poisoning

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. Plant damage from hail or light frost can affect photosynthesis and also increase nitrate levels. Once elevated, it can take several weeks before nitrate levels stabilise.

When ruminants eat feed containing high nitrate levels the nitrate is converted to nitrite by rumen microbes. Once in the bloodstream nitrite affects the ability of red blood cells to carry oxygen – effectively 'suffocating' the animal. Nitrate poisoning sets in rapidly and has no universally-suitable cure.

To minimise nitrate poisoning risk

- Use split nitrogen applications late in the season or use lower rates.
- Apply nitrogen after grazing.
- 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.
- Pasture nitrate levels are highest overnight and in the morning. Limit stock access to/intake of pasture at these times.
- Use in-shed feeding, feed pads or laneways, or fenced off areas on pasture to feed out supplementary feed and reduce pasture access.
- Minimise pasture intake in the first 1-2 weeks following drought-breaking rain.
- 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.



ANIMAL

PLANT

THE 'FINE PRINT'

Autumn is often when you address your big picture nutrients with lime and capital or maintenance fertiliser but it is also timely to consider micronutrient needs.

Some micronutrients [trace elements] can be very easily incorporated into your autumn fertiliser dressings with tangible benefits for pasture quality and production.



Molybdenum

Molybdenum helps clover fix nitrogen from the atmosphere and recycle it back to the wider pasture.

Check molybdenum levels by testing actively growing clover. If molybdenum levels are less than 0.1 ppm and nitrogen is less than 4.5%, applying molybdenum at the recommended rate is extremely unlikely to induce copper deficiency but will significantly increase pasture growth and clover content, with flow on effects for production and live weight gains. MAF research showed increases of up to 20% in annual pasture growth in responsive situations (usually where molybdenum had not been used for a long period).

New to market, Ballance NutriMax Moly is a refined, 1% molybdenum granule designed to give greater pasture coverage when applied with fertiliser.



Selenium

Selenium is relatively easy to address through fertiliser as its uptake by pasture is not generally influenced by levels of other macro or micronutrients or pH.

Improving selenium levels can increase stock fertility and growth rates. In a dairy context it can optimise milk production. If herbage test levels are below 0.03 mg Se/kg DM you may need to supply selenium to avoid deficiency issues in stock and take advantage of its performance and productivity benefits. Sheep and beef farmers generally apply 0.5 kg of 1% Se. Dairy systems or intensive sheep and beef operations may require 1 kg/ha.

Animal demand for selenium peaks in spring. Ballance's NutriMax Selenium combines both fast and slow release selenium to give pasture an initial lift and then sustain selenium levels over time. This makes it effective for autumn or spring application.



Copper

It is rare for copper to limit pasture growth but deficiency can affect grazing animals, particularly deer. Weak bones, wobbly gaits, pale coats and susceptibility to infection are signs of copper deficiency.

Copper levels are often low on sandy, peat and pumice soils. Early autumn is a good time to test copper levels and address any issues. Note sheep and cattle can be sensitive to copper if grazed too soon after application.

Which test is best?

Herbage testing is the right tool for measuring micronutrient [trace element] levels in pasture.

- Clover-only testing examines levels of micronutrients that support clover growth and so improve pasture quality.
- Mixed pasture testing tells you what your animals are actually eating. As well as monitoring micronutrient content, mixed pasture samples can be analysed to measure feed value or nitrate-nitrogen levels.

Blood and tissue testing reveals what micronutrients end up being used by the animal and can help identify where uptake is being affected by other nutrients in the animal's diet. In some cases pasture levels may be fine but animal uptake may still be insufficient and additional supplements may be required.

Be aware of seasonal variations and potential interactions with other elements and soil pH (e.g. high soil molybdenum and iron interferes with absorption of copper in stock).

MIND YOUR MAGNESIUM

Examining magnesium management for pastoral farming.

Both plants and animals need magnesium for protein synthesis, energy metabolism and to activate vital enzymes.

Magnesium and pasture

Until relatively recently, magnesium deficiency was rare in New Zealand pastures, except for those on coarse pumice soils. However, farming removes magnesium and it can also leach from the soil in wet conditions.

High levels of calcium also affect magnesium leaching and pasture uptake. When calcium levels rise in soil (e.g. immediately after superphosphate or lime application) magnesium can be displaced into the soil solution. Potassium has a similar effect on magnesium levels.

If lost magnesium is not replaced, levels inevitably fall and deficiencies appear. Magnesium deficiency shows in older growth first. Leaves become mottled or striped with red-orange colouring but veins remain green.

Quick Test Mg (QT Mg) measures the amount of magnesium that is readily available for plant uptake. Lack of magnesium will limit crops and pasture growth when QT Mg results drop below 6. Optimum levels for plant growth are QT Mg 8-10. It takes 7 kg Mg/ha to raise soil Quick Test levels by 1 unit, over and above maintenance requirements.

For pastoral farming, Serpentine Super is a useful product for magnesium management. It combines serpentine rock with superphosphate. Acid in the mix makes some of the magnesium in the serpentine rock more soluble. Consequently, about 70% of the total magnesium in Serpentine Super is plant available within one year with the balance released over the following year (see Figure 1).

In a Fertiliser and Lime Research Centre study (Loganathan et al, 2005) Serpentine Super was applied at a rate of 100 kg Mg/ha and herbage Mg levels measured over 30 months. Around 43% of the magnesium was released for plant uptake by day 282 and 67% by day 865. Even 30 months after application the Serpentine Super was still releasing magnesium for plant uptake, as shown by the levels of dissolved and partially dissolved magnesium in the topsoil. Herbage from plots treated with Serpentine Super contained 57% more magnesium than herbage from control plots.

Magnesium and animals

Animals cannot store magnesium and so rely on a regular daily intake from feed. Grass staggers/tetany (hypomagnesaemia) is the clinical sign of magnesium deficiency but sub-clinical deficiency can affect production.

Stock can become magnesium deficient even if pasture is not. Pasture magnesium concentrations vary seasonally and are naturally lowest in the spring, when animals need magnesium the most. As mentioned, applications of lime, superphosphate and potassium (whether in spring or autumn) can also influence magnesium uptake by pasture and its availability to grazing stock. Consequently, lime/superphosphate application is not recommended in the two months leading up to calving or lambing.

Herbage testing will confirm how much magnesium animals can get from pasture. It can be difficult and costly to raise soil magnesium levels high enough to protect animals from deficiency before and during calving, so additional magnesium supplementation may be needed. Drenching, dosing drinking water or dusting feed are options.

For advice on magnesium management for your farm, talk to your Ballance Nutrient Specialist.



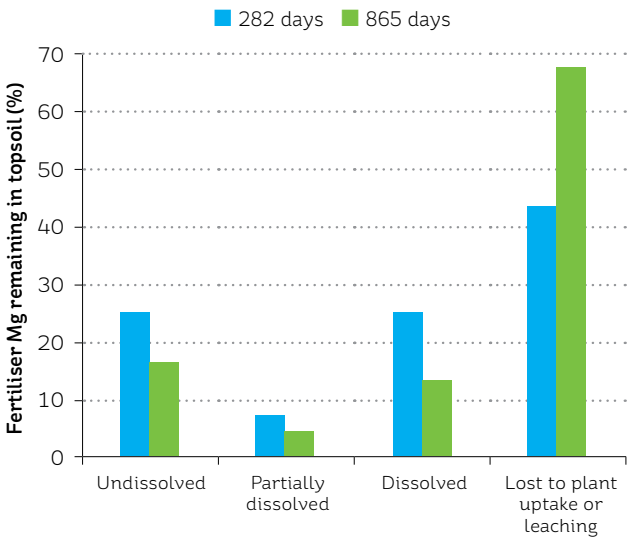


FIGURE 1
The release of magnesium from Serpentine Super.

ANIMAL

PLANT

SOIL

OVERSEER® UPDATE

The latest upgrade to OVERSEER® expands its range of farm systems and improve its approach to modelling grazed seed crops.

"Scheduled for release during late April-May, Version 6.3.0 adds outdoor pigs to the extensive range of farm systems that OVERSEER® can model," explains Ian Power, Ballance Science Extension Officer and Environmental Management Specialist. "Other farm systems already in OVERSEER® include dairy, sheep, beef, deer, goats, kiwifruit, apples, grapes, avocados, peaches as well as seed, grain and some vegetable crops."

The upgrade also introduces improvements for farms that include grazed seed crops, which will require changes to the way these crops are entered into the program. "As usual, support will be provided through release notes and the OVERSEER® Best Practice Data Input Standards available from MyOVERSEER® and through newsletters from OVERSEER® Limited."

Easier, faster, more accessible interface

Overseer 6.3.0 has also had a facelift, with a new interface designed to make it easier and faster for you and your consultants to enter and manage data. Behind-the-scenes changes will support better trend analysis, farm data protection and audit capacity.

Why does OVERSEER® keep changing?

OVERSEER's® annual upgrades may seem superficially annoying but continuous improvement is essential to keep the program relevant, comprehensive and user-friendly.

- Feedback from OVERSEER's® online helpdesk helps to improve the user experience and fix bugs.
- Peer review and evaluation processes ensure the model uses the latest science.
- Evolution of farm practices influence OVERSEER's® modelling.
- Requirements of regional councils and other regulatory bodies also influence changes, particularly to the variety of farm systems included in the model.

"Every update improves how the model predicts nutrient flows," says Ian. "OVERSEER® can currently model the movement of nitrogen, phosphorus, potassium, sulphur, calcium, magnesium and sodium through your farm system."

The new version will be available on a subscription basis. See www.overseer.org.nz for more information.

Ian Power was involved in version testing OVERSEER® at AgResearch and now is on both the OVERSEER® Science Advisory Group and Best Practice Data Input Standards committee. Ian trains Ballance team in the program's use.



Ian Power

MILEAGE FROM MAIZE SILAGE

If this summer and autumn has left you a bit short of pasture, consider maize silage as an option next year.

Maize is very efficient at converting sunlight to biomass, capable of generating 1.6 tonnes of DM/ha for every 100 MJ of intercepted solar radiation.[1] However, a number of factors influence this process:

Sowing time: Ideally, you need to have a full canopy in place when radiation peaks in late December.

Available growing degree days (GDDs): For maize, this refers to the accumulated number of days when the average temperature is over 8°C.

Hybrid: Different maize hybrids have different leaf mass (which influences energy capture), different GDD needs (which determines how long they take to mature) and varying ability to tolerate stresses like drought or disease. Choose the right hybrid for your growing conditions.

Population: More plants mean more leaf area and more yield. Usually you would sow about 100 to 120 thousand seeds per hectare and expect to lose around 5 thousand/ha. Check the hybrid label.

Weeds, disease and pests: Many weeds grow faster than maize seedlings and without intervention they can reduce maize yield (by up to 30%), make harvest difficult and contaminate silage. Common rust, eyespot and northern corn leaf blight are common diseases but fungicide application is rarely economical. Use treated seed for Argentine Stem Weevil (ASW) and black beetle. Treat Greasy Cutworm with appropriate pesticides.

Soil structure and moisture: Prolonged waterlogging and/or compaction will inhibit nutrient uptake and cause losses. Drought will reduce maize yield by 22 kg DM/ha for every millimetre of potential soil moisture deficit.[2]

Spoilage from poor ensiling and use can affect the economics of maize silage. Maize must be harvested at the right point (30-40% dry matter) for successful ensiling. Silage must be well-sealed[3] to exclude oxygen, so avoid poking holes in the stack with tools or machinery.

Good groundwork

Choose paddocks suitable for harvesting machinery (good access, flat, not prone to compaction). A recent basic soil test (0-15 cm depth) and a deep N test (0-60 cm) for mineral N plus yield estimates will inform your fertiliser decisions.

Maize is very efficient at utilising phosphorus (P). A crop yielding 20 tonnes of DM/ha will remove 50 kg P/ha. Your cultivation practices are likely to have a bigger impact on P levels than the crop. Ploughing before or after your maize crop is likely to bury applied phosphorus beyond the reach of pasture and bring lower fertility soil to the surface. Maize does not need a fine seed-bed, so is suited to low-impact tillage methods such as direct drilling and strip tilling.

In a **cropping** situation, nitrogen is typically the largest nutrient input for maize, with around 20-50 kg N/ha applied at sowing and 100-200 kg N/ha applied (around 12 kg N/tonne yield) as a side-dressing six to eight weeks later. However, **paddocks coming out of long term pasture** can supply up to 300 kg N/ha from soil organic matter. You may still choose to apply some starter fertiliser but may not need to apply side-dressings. A deep N test will help inform this.

Maize removes large amounts of potassium, which should be replaced post-harvest (around 12 kg K/tonne maize).

[1,2] Glassey, G. Kaufler, K. Parker, M. Pearson, A. Williams, G. Johnstone, P. 2009, *Best Management Practice for Growing Maize on Dairy Farms*, Foundation for Arable Research (FAR).

[3] Bunds are more flexible but bunkers, while more expensive, result in less waste.

For more advice on nutrient management for maize, talk to your Ballance Nutrient Specialist.



Use maize silage

- as a break crop in pasture rotation
- to meet a feed deficit
- to hold stock numbers over winter
- to provide an additional income
- to utilise nutrients in your effluent area
- to help manage N loss (maize silage is a low-N feed)

NURTURE YOUR KIWIFRUIT

Annual nutrient inputs will support vigorous vines and good crop volumes.

On average, a kiwifruit crop will remove 6t/ha of dry matter from your orchard at harvest, taking with it a large quantity of vital nutrients, which need to be replaced to sustain production.

Post harvest (late May through July) is a good time to assess your orchard's lime and fertiliser needs. "Ideally you want to fit your liming and base fertiliser application around mulching and pruning but before the ground gets too soft for machinery," says Ballance Horticulture and Arable Business Manager Shaun Vickers.

Try to sample your soil at a similar time each year to establish more robust trend data. You need to take 15-20 cores from sites across a block to best represent the block's attributes. Take the sample from the root zone of the female vines at a depth of 15 cm.

Test blocks separately that:

- differ in age;
- are planted with different varieties;
- are performing poorer/better than others;
- have different soil types;
- have different topography;
- have a different fertiliser history.

Fertiliser options

In addition to base fertiliser, kiwifruit need special attention during the spring growth period[1].

Early-September: Nitrogen, phosphorus, potassium and sulphate should be applied at or close to bud-break to support new leaf/shoot development. A high-quality compound fertiliser such as YaraMila Complex is the perfect choice for this.

Mid-October: A pre-flowering application of nitrogen and potassium to support the vines through to fruit set.

Late Nov/early December: A further post-flowering application of potassium (e.g. sulphate of potash) and/or magnesium (e.g. kieserite) may be required depending on crop loading. A further small application of nitrogen may also be required.

Leaf samples can be taken and tested throughout the growing season to assess nutrient levels. This data may be used to adjust further applications. Often overlooked, trace elements (micro-nutrients) are as important as macro-nutrients.

For more advice on soil sampling and fertiliser programmes to support your kiwifruit crop, contact one of the Horticultural Specialist team.

[1] Application timings are a general guide and may differ depending on kiwifruit variety and/or growing region.



Key soil test information and related target ranges for kiwifruit

	Target range	Comment
pH	5.8-6.5	Despite this target, pH levels of 6.2-6.5 are common in kiwifruit orchards. Consistently high-producing blocks need a pH of 6.5-6.9.
Phosphorus	30-60 mg/L	Vital for photosynthesis and plant metabolic processes.
Potassium	0.60-1.2 me/100g	Kiwifruit require relatively high levels of potassium to regulate many of the plant's functions.
Calcium	6.0-12 me/100g	Supports root and shoot growth as well as cell wall development, which affects how well the fruit will store.
Magnesium	1.0-3.0 me/100g	A core component of chlorophyll and therefore vital for photosynthesis, which provides energy for plant and fruit development.
Sodium	0.0-0.40 me/100g	
CEC	12-25 me/100g	If CEC is low, nutrients may be more inclined to leach from the soil. Compost or manure can help improve CEC.
Volume weight	0.60-1.0 g/ml	

Avoid applying fertiliser three days either side of hydrogen cyanide spraying or before heavy rain.

HERBS TO BEAT THE HEAT

Looking for forage options that suit dry conditions? Chicory or plantain may be the answer.

Chicory's taproot and plantain's fibrous root system allow them to forage more deeply for nutrients than grasses and clover and cope well with dry, summer conditions. "Both provide high-quality feed making them useful for supporting milk production in a dairy operation or finishing stock on a sheep and beef farm. They can be grown as part of a mixed pasture or as stand-alone break crops in a pasture renewal program," says Ballance Forage Specialist Murray Lane.

Both are sown in spring but, as with any spring-sown crop, start planning now for best success.

Start well to end well

Chicory and plantain do not perform well in heavy clay soils or in conditions that are prone to waterlogging but otherwise are tolerant of a wide range of soil types, pH and fertility. However, if you plan to re-sow pasture after the crop, fertility and pH issues should be addressed now. Lime in particular needs time to take effect.

As with any seed, applying starter fertiliser at sowing supports early growth providing ready access to key nutrients until the root system is able to forage further afield. With chicory, insufficient N can decrease the leaf area of shoots and significantly reduce dry matter during early growth.

- DAP is a good option providing N and P, the two nutrients most critical to early crop growth (around 150 kg DAP/ha if the drill has a fertiliser box, or 250 kg DAP/ha if broadcasting).
- Cropzeal 16N is useful if soil potassium levels are low (<Quick Test 4), or if plantain or chicory is being sown into a paddock that has come out of another crop (around 250-350 kg/ha).

Nitrogen needs

- If soil testing shows that soil available N levels are high (>200 kg N/ha) – as may be the case if the paddock has previously been in pasture - it may not be necessary to apply post-grazing N.
- Chicory may benefit from post-emergence nitrogen (30 kg N/ha) three to four weeks after the crop has been planted (see also Figure 1).
- If you apply nitrogen to pure stands of plantain it will promote growth but if the plantain is part of a mixed pasture, other species may respond more rapidly to the detriment of your plantain. It's better that plantain or chicory fills holes in your pasture than annual or summer grasses.

If post-grazing N is required, standard practice would be to use around 40 kg N/ha (or 30 kg N/ha if growing conditions are good) two to four times after grazing through spring and summer. If you keep the crop through winter then apply N towards the end of the season to boost growth before the first spring grazing in September.

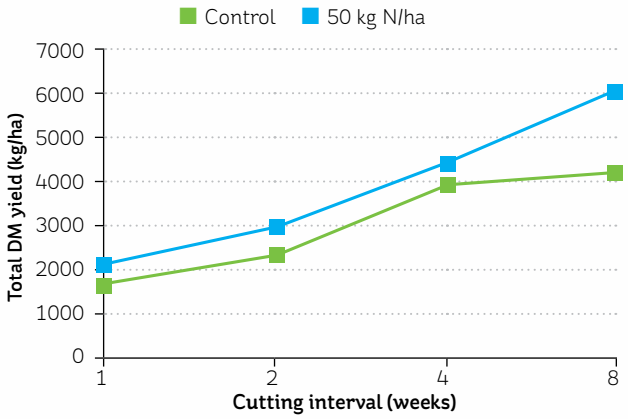


FIGURE 1
Chicory response to a single spring application of 50 kg N/ha in comparison to no N. From Clark et al. (1990), Growth rates of 'Grasslands Puna' chicory (*Cichorium intybus* L.) at various cutting intervals and heights and rates of nitrogen, *NZ J Ag Res.*, 33: 213-17

AgResearch scientists have shown the value of fertiliser N applications to chicory grown on a sandy loam soil. Applications of 50 kg N/ha after cutting (to simulate grazing) resulted in greater dry matter yield than untreated control crops. However, if excess N was applied, crop yield was depressed, and the crop went to seed.



FODDER BEET RESEARCH

As part of the Fodder Beet Agronomic Solutions Research Programme (FBAS), Ballance is helping New Zealand farmers to produce more reliable, higher yielding fodder beet crops in a sustainable way.

"Fodder beet is an attractive winter forage option because of its high yield. However, most of our knowledge about how to grow it comes from Europe where the environmental conditions are very different and where it is usually lifted and fed to animals in barns, rather than being grazed in-situ," says Ballance Science Extension Officer Aimee Dawson. "This research is helping to fill that gap."

Year 1 findings

Year 1 research was conducted at seven sites throughout New Zealand: three in the North Island (Waikato, Taranaki and Whanganui) and four in the South Island (Gore, Riverton, Orari and Southbridge). The initial focus has been on nitrogen, potassium and boron needs (fodder beet has a very low requirement for phosphorus, hence the exclusion of this nutrient) and timing. The next phase will use five sites, to re-examine nitrogen use and investigate the impact of disease, herbicide and pesticide use on yield.

"The broad brush learning from Year 1 is that fodder beet has probably been over-fertilised on many New Zealand farms," says Aimee. "Because it is an expensive crop, we've probably been over-generous with some nutrient inputs in a desire to get it right...You can still grow a high-yielding crop with less fertiliser but you may need to manage other things, like establishment, fungicide and herbicide use or how you graze the crop."

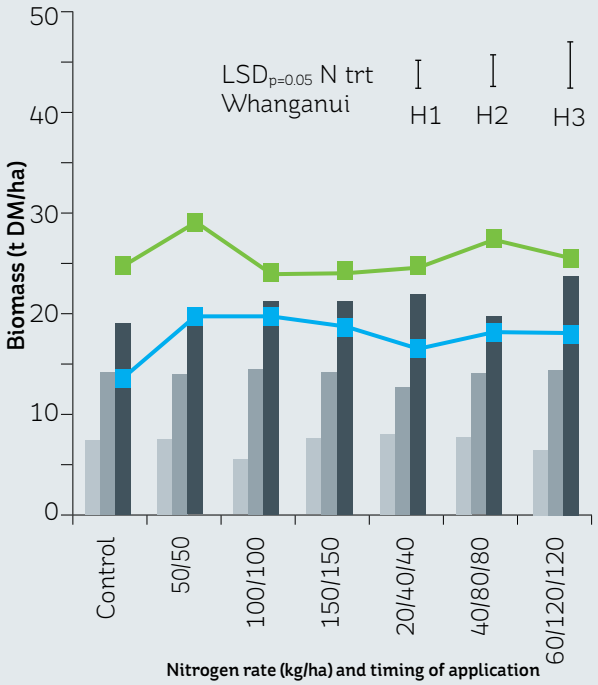
Research rewards

The Fodder Beet Agronomic Solutions Research Programme (FBAS) is a three-year project supported by the Ministry for Primary Industries Sustainable Farming Fund, the Foundation for Arable Research (FAR), Beef + Lamb NZ, DairyNZ, Ballance Agri-Nutrients, Ravensdown, Seed Force, Agricom, DLF Seeds NZ, Agriseeds, Cropmark Seeds, Bayer Crop Science and the South Island Dairying Development Centre (SIDDC). Sustainable Farming Fund projects have a strong emphasis on extension. FBAS has already run a number of field days to share research outcomes from Year 1 and at the end of the project will produce a 'Best Management Production Guide', which will be distributed through industry partners. Field days on Year 2 findings (including fungicide strategies) will be starting soon.

By participating in these projects Ballance enables access to well-designed, independent research to support your on-farm decisions.

Nitrogen

As with any crop, nitrogen is essential to develop a strong, leafy canopy. "With fodder beet, early canopy development is vital to capture as much sunlight as possible to drive bulb growth," says Aimee. "The research findings supported our previous investigations. Fodder beet needs around 150 to 200 kgs of nitrogen per hectare in total – from the soil and the bag. There is no significant difference in yield between two and three applications but applying more nitrogen early in the season is important."



Bars represent different harvest dates at the Whanganui site. Error bars show the least significant difference (LSD) between treatments for each of the harvest dates (H1, H2 and H3).

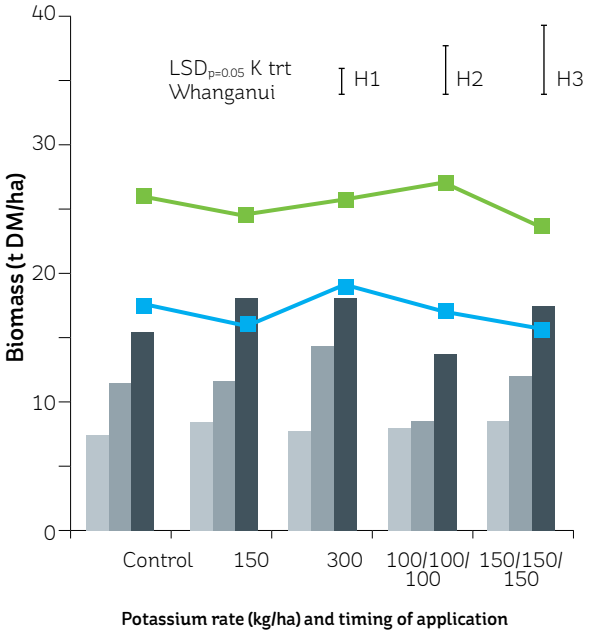
FIGURE 1
Influence of nitrogen (N) rate and timing on fodder beet yields – North Island sites.

The same trends were observed on the South Island sites.

Potassium

"Potassium is a particularly hot topic because we have seen a lot of variety in recommendations and the general thinking has been more is better," says Aimee. "What the research showed was that as potassium rates increased, the crop took up more but there was no significant increase in yield. It's the classic luxury uptake story."

This means that the focus should be on replacing what the crop removes. "If you're feeding in-situ most of the potassium will be returned to the paddock, albeit unevenly," says Aimee.



Bars represent different harvest dates at the Whanganui site. Error bars show the least significant difference (LSD) between treatments for each of the harvest dates (H1, H2 and H3).

FIGURE 2
Influence of potassium (K) rate and timing on fodder beet yields – North Island sites.

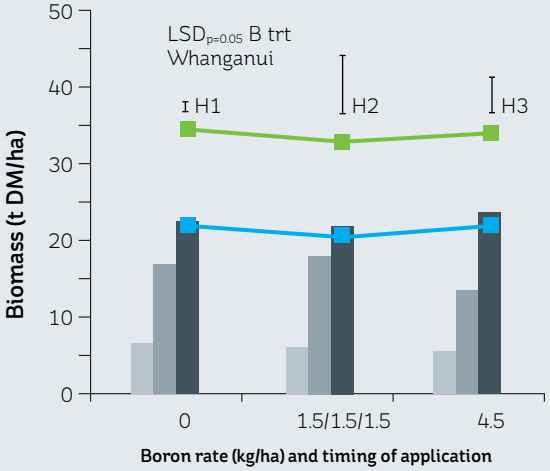
The same trends were observed on the four South Island sites.

Feeding fodder beet

When feeding fodder beet it is important to remember that it has low levels of fibre, phosphorus and crude protein. Silage is a good complement to fodder beet and DCP or mineral blocks can address the phosphorus issue. Lack of phosphorus can lead to creeper cow and because fodder beet is not a typical winter feed, potential for this deficiency may not be on your radar. If your fodder beet crop has high potassium levels, you need to consider the impact on animal health, particularly during the early lactation period. Also be aware of the potential for pugging/compaction when grazing in-situ during winter, especially on heavier soils.

Boron

While fodder beet is not a brassica, like brassicas it is prone to brown heart. Keeping soil boron levels above 1 part per million is the best defense. All of the trial sites had sufficient soil boron, so no brown heart appeared even where it was not supplied. However, the trials did show that additional boron did not influence yield and it made no difference to boron concentration in the plant whether it was applied in base fertiliser (4.5 kg B/ha) or with side-dressings (3 x 1.5 kg B/ha).



Bars represent different harvest dates at the Whanganui site. Error bars show the least significant difference (LSD) between treatments for each of the harvest dates (H1, H2 and H3).

FIGURE 3
Influence of boron (B) rate and timing on fodder beet yields – North Island sites

The same trends were observed on the four South Island sites.



ARE YOU MYBALLANCE READY?

Our exciting, new online platform is designed to make it much easier to do business with us. Your MyBallance account can be accessed on any device – desktop, laptop, tablet or mobile – allowing you to see your fertiliser history, make fertiliser management decisions and place orders 24/7.

We've worked closely with farmers across New Zealand to ensure MyBallance meets your needs, and allows greater collaboration with you and your team. MyBallance allows you to:

- Create your own fertiliser mixes, including any specific micronutrients, and order them immediately and easily reorder successful mixes.
- Set up additional account users to allow your farm manager to place orders or let your accountant access information directly.
- Request an update to your Customer and Property details so that you know you're receiving all the most important farm specific information, promotions and updates.
- See a concise summary of your current and expected spend, and nutrient use without the hassle of manual spreadsheets.
- Let merchants, spreaders and Ballance Customer Services order for you with shared fertiliser plans.
- Keep on top of your nutrient use and spend with a wide range of downloadable and printable reports.
- Place an urgent order with quick and simple online ordering.

Get started by registering and setting up your farm map (an existing aerial image, GPS map or draw your own).

Ballance customers can sign up now at MyBallance.co.nz. You will need your phone number, email and Ballance customer number.

My Ballance®

MAKE WAY FOR MITAGATOR®

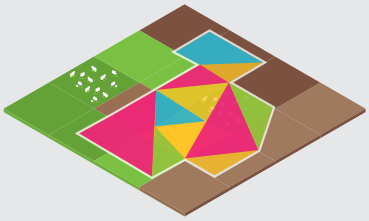
MitAgator's® formidable modelling power is about to get real and our Farm Sustainability Services team is expanding to meet wider demand. As New Zealand's leading farm sustainability planning tool, MitAgator® helps you develop the best possible plan for reducing your nitrogen, phosphorus, sediment and E. coli losses. MitAgator Farm Environment Plans are robust, quantified plans that help farmers to confidently and cost effectively manage environmental change on farm.



MitAgator requires an accurate digital farm map. This can be acquired by GPS, plane or drone technology.



The map is combined with your OVERSEER® file, along with soil and elevation data from national databases (or more specific datasets if these are available).



MitAgator® generates risk maps, highlighting critical source areas for N, P, sediment and E. coli loss.



You can then use MitAgator® to run scenarios comparing the effectiveness and cost of different solutions for a specific target. (e.g. a 10% reduction in P loss)

Get mapped

A onetime investment in an accurate farm map provides instant and enduring returns. Add value across your whole business from planning to recording (proof of application), decision support, compliance, Health & Safety, benchmarking and more. Ask your Nutrient Specialist about Ballance Mapping Services or call us on 0800 222 090.

THE AHUWHENUA TROPHY

The Ahuwhenua Trophy highlights excellence in the Māori farming sector and offers a valuable opportunity to gain insights into successful, sustainable farm businesses.

As Grow hits your mailbox, the finalists in the Ahuwhenua Trophy will be gearing up for the public field days that precede the annual awards dinner. No one walks away from the finals empty handed with the winner receiving a minimum of $40,000 worth of prizes and runners up walking away with $15,000 package.

However, as with the Ballance Farm Environment Awards, entrants find participating in the process – the judging audit, the benchmarking opportunities and the tips gained from judges, other entrants and field day attendees – is a prize in itself, with huge benefits for their farm business.

In both the preliminary round and the finals, the judging panel examines the farm's performance against criteria related to:

- governance and strategy
- social/community contribution and Ngā Tikanga Māori
- financial outcomes and benchmarking
- feed production
- animal performance
- management of human resources
- environmental/sustainability goals and strategies

Now in its 86th year, the Ahuwhenua Trophy was originally the brainchild of visionary Māori leader Sir Apirana Ngata and then Governor General Lord Bledisloe. New Zealand was in the thick of a worldwide depression and prices for primary products were falling dramatically. Ngata realised this represented a considerable risk to what remained of Māori land. By establishing the award, he hoped to encourage and incentivise Māori farmers to perform to higher levels in all aspects of their operations.

In 1954, the competition was divided into two separate awards: one for dairy and one for sheep and beef. It continued in this format through to 1990, when a lull in interest brought it to a temporary halt.

In 2003 the award was re-launched with new criteria reflecting the changing face of Māori farming and the increasing importance of Māori Incorporations and Trusts in the agribusiness sector. Since 2005, the annual competition has alternated between dairy and sheep and beef and in 2012 an award for young Maori farmers was added.

"Ballance Agri-Nutrients has been a silver sponsor of the trophy since 2003, recognising the importance of supporting growth and excellence in the Māori Agribusiness sector," says Ballance Business Development Manager Aaron Stafford. "The Ahuwhenua Trophy is a very prestigious award with a rich history of highly deserved winners. As a consequence, there is a huge amount of mana bestowed upon the recipient."

Ballance joins platinum sponsor BNZ, gold sponsors DairyNZ, Te Tumu Paeroa, Te Puni Kōkiri, Fonterra and the Ministry for Primary Industries, fellow silver sponsors AgResearch, PGG Wrightson and Massey University and bronze sponsors AFFCO, Allflex, BDO, Ecolab as well as Landcorp, Tohu Wine and WorkSafe.

The 2018 Ahuwhenua Trophy competition is focused on dairy. Finalist Field Days are open to the public and will be held on Thursday 5 April and Thursday 12 April.

Go to ahuwhenuatrophy.maori.nz for more information.



Farm manager Lloyd Brennan (right) and Head shepherd Brooks Cooper (left) from 2017 winners Omapere Taraire & Rangihamama Trust.

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