Ballance agri-nutrients

GROW

SOUTH ISLAND
SPRING 2016

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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, many of which attract a rebate for shareholders.

ballance.co.nz • 0800 222 090

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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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MILK UREA: FACTS VS FICTION

Milk urea (MU) values are regularly provided to dairy farmers, but not everybody knows how to interpret them, or realises they have little to do with environmental nitrate loading.

When a cow digests dietary protein, her rumen creates ammonia. Some of it is absorbed through the rumen wall, enters the bloodstream and is converted to urea by the liver. While much of the urea is excreted in urine, some passes into the milk, where it's measured as MU.

Since milk companies started providing MU information in late 2013, dairy farmers been inundated with misinformation as to what these values mean.

'Essentially, MU is an indicator of dietary protein,' says Ian Power, Ballance Environmental Management Specialist. 'Cows fed on high-quality (high-protein) pasture will produce a higher MU content.'

In low-input systems, where pasture makes up more than 60% of the diet, MU levels are often greater than 30 mg/dl. This is evident in much of New Zealand, where pasture-based systems dominate; good amounts of crude protein (20–25% CP in quality pasture) are not uncommon. Fact is, our cows graze higher quality pasture and consume more protein compared to those in overseas systems that feed a total mixed ration.

High-input systems, on the other hand, where lower protein supplements make up the majority of the diet, can result in low MU levels.

Knowing whether your MU levels are low or high may highlight a deficiency or excess of protein in the diet, allowing you to tweak supplements accordingly. Thus, if levels are elevated, you might remove expensive protein supplement from the diet or add it if levels are too low.

Additionally, there is no conclusive evidence that high MU levels are detrimental to the cow's milk production, her health or reproduction.

Levels below 20–25 mg/dl may indicate that dietary protein is limiting milk production. However, keep in mind that MU is not a sensitive indicator of dietary protein. It is affected by several other factors, such as water intake, stage of lactation, season, genetics, milking frequency, rumen health and liver function, among others. A low MU should therefore be followed up with a comprehensive dietary assessment and laboratory analysis of feed ingredients.

Ian also rectifies a persistent myth regarding MU and nitrogen leaching. 'Contrary to popular belief, high MU doesn't mean there's less urea in the urine,' he says. 'If anything, the opposite is the case.'

And while MU values are associated with urinary nitrogen, they play an insignificant role in terms of environmental nitrogen loading. Farm features such as effluent management, stocking rate or pasture utilisation have a far bigger impact than MU levels.

Extensive information is available on www.dairynz.co.nz

Milk urea at a glance

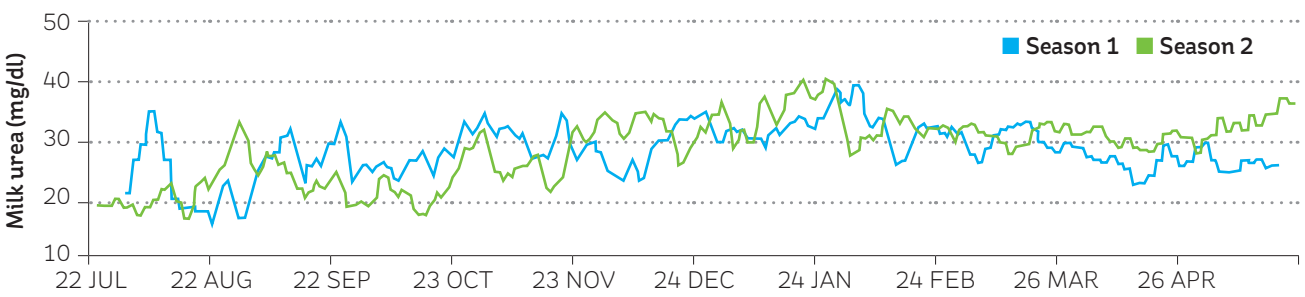
- MU is an indicator of dietary protein
- Low MU levels may indicate a low-protein diet
- High MU level may indicate a high-protein diet
- MU levels play an insignificant role in nitrate leaching
- High MU is not considered to be detrimental to the cow's health

	Early lactation	Mid lactation	Late lactation
Minimum CP% in diet	18	16	14
Approximate MU (mg/dl)	25-40	25-30	20-25

TABLE 1
Recommended dietary crude protein (CP) requirements and an example of MU levels at different stages of lactation. Source - DairyNZ

What's a dl?

dl stands for decilitre; 1 dl = 100 ml = 0.1 litre



Seasonal pasture quality affects milk urea levels within and between years

PLANT

SOIL

THE PATH TO PRECISION

Variable rate fertiliser application, precision crop sowing, GIS, GPS and drone technology – it's all being used overseas, and it's on its way here.

Arable farming in New Zealand has a good reputation for producing quality crops and for making efficient use of nutrients and water. However, as with most things, there's always room for improvement.

'When it comes to arable crops, the way forward looks to be all about precision,' says Ollie Knowles, Precision Agriculture Specialist for Ballance. 'New technologies are being developed all the time and they're gradually being adopted by more and more farmers. Ultimately, what is novel today will become standard practice in a few years. Farmers who get in early are going to have a real advantage.'

Ollie recently attended a precision agriculture conference in the United States, and while there saw first-hand how technology is being implemented on farm, as part of growers' efforts to improve yields.

'One of the first things I noticed was their approach to their base fertiliser,' says Ollie. 'Rather than just soil testing a few paddocks and then applying a general blend to suit the average result, they get much more detailed. The testing is done within paddocks, taking a grid-like approach, so that they build up a picture of the variation across the paddock.

'They're not using any sort of spectral techniques for base soil testing – yet. It's the tried-and-true manual soil testing method that we use here in New Zealand.'

'SPECTRAL TECHNIQUES USUALLY INVOLVE ANALYSIS OF IMAGES TAKEN AT WAVELENGTHS THAT CAN'T BE SEEN BY THE NAKED EYE.'

If the results show that the nutrient levels vary through the paddocks, base fertiliser is applied differentially to even out nutrient levels. This means multiple passes, each applying a single nutrient at a variable rate. The initial pass usually applies lime to correct regional differences in soil pH. Then a second pass will apply phosphate, a third will apply potassium. If necessary, sulphur and magnesium are also applied, but again, at variable rates in separate passes. As you can imagine, this is a high-tech operation, and relies on GPS data and GIS mapping layers to deliver the required level of precision.

'By taking this approach, they're aiming to get even soil fertility across the whole paddock,' says Ollie. 'Of course, in the States they work with some pretty large paddocks. Whereas here we'd see 10 hectare paddocks, in the US 100 hectares is not uncommon. But the principles could still apply here.'

While the base fertiliser used to correct soil nutrient levels is broadcast, when it comes to the starter fertiliser, drilling is the only way to go.

'The fertiliser used will be specific to the crop being grown,' says Ollie, 'but it's always a compound fertiliser. This type of fertiliser contains all of the nutrients in a single granule, so each seed is supplied with the same nutrient profile, which helps to promote more even crop growth.

'Compound fertilisers are used in New Zealand already – DAP is the most common – but high-analysis fertilisers are not used extensively yet. They are a bit more expensive than blends, but the quality more than makes up for that.

'They are the only sensible choice if you are drilling, because their hardness, the lack of dust and the consistent, even size of the granules means they can be drilled without drama. On top of that, since each granule contains the same ratio of nutrients, all your plants get the same nutrition, right from day one.'

Post-emergence crop management in the USA is also different to that commonly encountered in New Zealand. Rather than take a blanket approach for the whole crop, growers analyse the crop's performance systematically, looking for areas that are underperforming and then taking specific action to address the cause. This could mean the variable application of nitrogen to boost growth, or applying trace elements to address an incipient deficiency, or the targeted use of agri-chemical sprays to combat pockets of disease.

'There's some great technology available to support this in the US,' notes Ollie. 'The use of drones is becoming quite popular, and satellite imagery is widely used too. The resolution of this is impressive – it's accurate to around an inch.'

The analysis doesn't stop there, either. The results of this year's crop are used to shape approaches for the next crop.

'In the States they are usually double cropping the land,' says Ollie, 'so they try to build up a picture of relative performance across paddocks. Then the next season they will sow at a higher density in areas that have been high producing, and use a lower seed rate in areas that don't perform so well. That way, if they've got an area where production is going to be limited by factors that they can't influence, they're not wasting money on trying to get more yield than is possible.

'The precision approach is certainly interesting, and it's going to be exciting to see how these technologies get adopted in New Zealand, and just what they can do for our arable productivity.'

Introducing YaraMila Actyva S

The latest compound fertiliser to become available through Ballance is YaraMila Actyva S, a high-quality product specifically designed for use in the arable market.

Like all compound fertilisers, YaraMila Actyva S offers a number of benefits for farmers looking to improve crop yields through a more advanced approach to plant nutrition.

- **No segregation** – unlike blends, compound fertilisers never suffer from segregation issues, so when the product is spread, the nutrients are applied evenly across the treated area
- **Superior handling** – the hardness and even size of YaraMila Actyva S granules means they are easy to apply accurately, whether by machine or hand
- **Even nutrition** – each granule of YaraMila Actyva S contains the same ratio of nutrients, which means the whole crop is supplied with the same nutrient profile, something that's nearly impossible to achieve with a blend

While YaraMila Actyva S is primarily aimed at the arable market, it can be safely used on a range of crops. These include spring barley, winter barley, winter oats, winter wheat, oil seed rape, brassica seed crops, grass seed crops and precision-sown fodder beet crops. However, YaraMila Actyva S should not be used on chloride-sensitive crops, for example, avocados, onions and potatoes.

For more information on YaraMila Actyva S, talk to your Ballance Horticultural Specialist or Nutrient Specialist.

YaraMila Actyva S	
Nitrogen	15%
Phosphorus	7%
Potassium	12.5%
Sulphur	3%
Magnesium	1.2%
Boron	200 ppm
Manganese	200 ppm
Zinc	200 ppm

DO RATIOS REALLY MATTER?

Alternative approaches to anything can be quite attractive, with their promises of new methods and better results. But they don't always deliver . . .

Most farmers in New Zealand follow a fairly conventional approach to fertiliser. They appreciate the tried and tested method of soil testing and analysis that determines what nutrients are missing, and indicates how best to replace them. They've seen the results of this approach, watching their farm productivity gradually increase in response to the improved soil fertility.

Yet for many, the idea that there might be another way is always at the back of their mind. Is there a different approach, one that might radically change farm performance, bringing profit and peace of mind?

The rise of ratios

One alternative approach that has attracted attention in New Zealand is the ratio theory of soil fertility. This was first proposed back in the 1940s, when a small group of American scientists working with alfalfa suggested that an 'ideal soil' should have 65% of its cation sites occupied by calcium (Ca), 10% by magnesium (Mg), 5% by potassium (K) and 20% by hydrogen. Other researchers subsequently proposed slightly different ratios, relaxing the prescription by using ranges, e.g. 60-80% Ca, 10-20% Mg and 2-5% K.

According to this theory, the actual quantities of the basic cations present in the soil are less important than the ratio in which these cations occur relative to each other. So, rather than aiming for a Quick Test Mg of 8-10 or a Quick Test K of 5-8, adherents of this theory aim to achieve set ratios, e.g. a Ca:Mg of 6.5:1 and a Mg:K ratio of 2:1

The idea of an 'ideal soil' caught on and the ratio theory was adopted by some agricultural consultants and farmers, especially in America. Foremost among them was William Albrecht, then a professor at the University of Missouri. His name is now often associated with this approach to soil fertility.

Definitions

Basic cations – calcium, magnesium, potassium, sodium

Base saturation ratios – the relative amounts of each base cation occupying the exchange sites, e.g. 60% Ca and 10% Mg is a 6:1 ratio

Cation sufficiency – the presence in the soil or other growing medium of sufficient levels of each cation to meet the crop's requirement for that cation

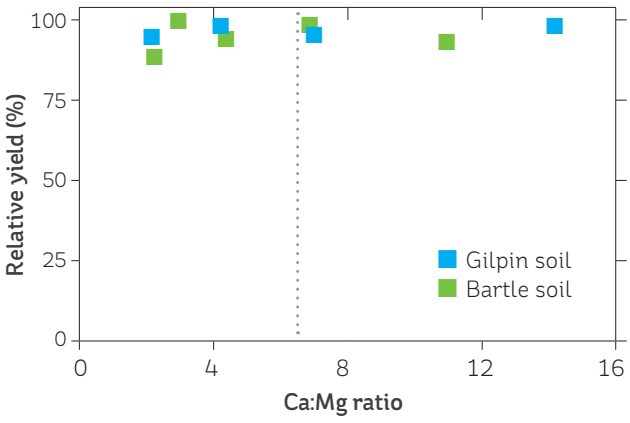


FIGURE 1
Effect of the exchangeable Ca:Mg ratio on the relative dry matter yield of German millet in two soils. The dotted line indicates the 'ideal' ratio (6.5:1) proposed by the base saturation theory (from Kopittke & Menzies, 2007)[1]

Research on ratios

Over the years, scientists have continued their study of this theory, examining the relationship between cation ratios and crop yields. To date, they have found little or no evidence for an ideal Ca:Mg or Mg:K ratio. The graphs shown in Figures 1 and 2 demonstrate this quite clearly.

In Figure 1, German millet was grown in soil with various Ca:Mg ratios to see what effect these ratios had on plant yields. The answer – they had no effect at all, in either of the two soil types used. The ratios tested ranged from 2.2:1 to 14.3:1. Interestingly, this work was conducted by a scientist named McLean, who had actually worked with Albrecht during the 1940s.

In Figure 2, the yield of white clover in soils with different Ca:Mg:K ratios is shown. The ratio for the 'ideal soil' is at the far right of the graph (65:10:5). Although no statistical differences were presented in the original paper, it's clear from the graph that no benefit can be attributed to the 'ideal soil'. Indeed, for the Annandale soil, five of the ratios tested produced higher average relative dry weights than the 'ideal soil'.

Risks from ratios

Proponents of the ratio theory use it as a basis for fertiliser recommendations, an approach that is not supported by Ballance, since there is no solid scientific evidence of its effectiveness. In fact, researchers in this field have noted that fertiliser applications made according to the cation balance approach resulted in a greater cost expenditure than was incurred by following the sufficiency approach (that is, the standard approach used by Ballance). In some instances, fertiliser recommendations made under the ratio theory involve such high application rates that farmers only put on a portion of the recommendation.

Having the 'right' ratio of Mg, Ca and K does not necessarily mean that there is enough of each mineral to support optimum crop yields. Imagine you've got six people sitting round the dinner table. You've agreed that the 'ideal' meal is six ribs, two roast spuds and a scoop of peas. On the table there are 30 ribs, 10 spuds and 5 scoops of peas. The ratios are correct, but the quantity is not – you have insufficient nutrients, so everyone will be a little bit hungry at the end of the meal. The same will be true for your crop, if there are insufficient nutrients in the soil.

If fertiliser recommendations made on the basis of the ratio theory result in low levels of either K or Mg, crop growth is likely to be constrained. Low Mg levels could also impact animal health; this will occur regardless of the 'correct' ratio of elements being present.

If lime is used to 'correct' the Ca levels in the soil, overliming may occur. This may in turn induce trace element deficiencies, reduce phosphorus availability and reduce crop yield. New Zealand soils are naturally high in Ca, and deficiencies are virtually unknown, so lime should not be applied for any reason other than to correct soil pH.

Our recommendation

While it's good to question the conventional wisdom and to keep an open mind about alternative approaches, it's important to look at the actual evidence supporting different theories. One of the hallmarks of good science is the ability to discard a theory when the evidence shows that it does not hold true.

For Ballance, the evidence in support of the sufficiency approach to fertiliser recommendation is overwhelming, while there is little to back the ratio approach. We recommend that, in New Zealand, the sufficiency approach be used for determining fertiliser requirements and that lime requirements are determined by analysing soil pH levels and, where appropriate, factoring in the cation exchange capacity of the soil.

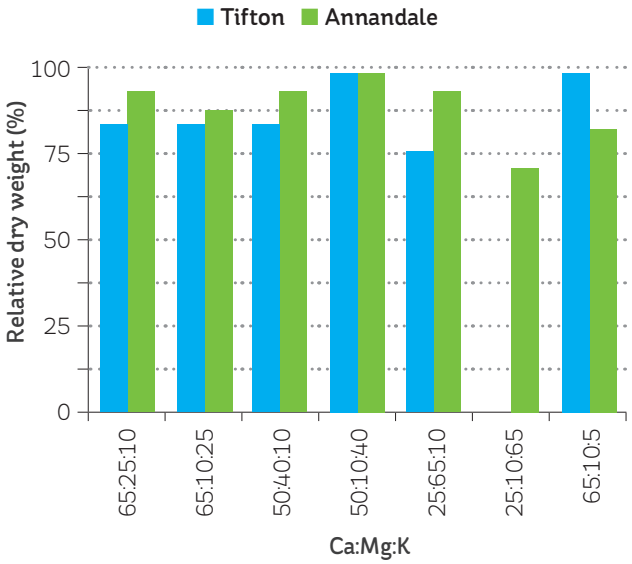


FIGURE 2
The effect of the saturation of the soil cation exchange capacity by various amounts of Ca, Mg and K on the relative yield of white clover (from Kopittke & Menzies, 2007)

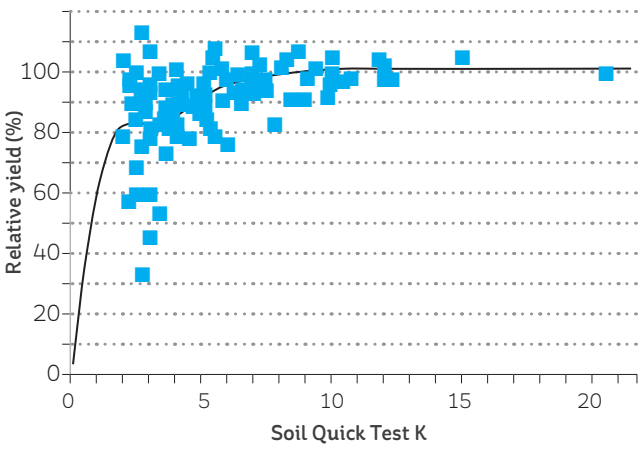


FIGURE 3
Relationship between relative pasture production and soil potassium (from Edmeades et al. 2010)[2]

1 Kopittke, PM & Menzies, NW (2007), A review of the use of the basic cation saturation ratio and the 'ideal' soil, *Soil Science Society of America Journal*, 71: 259-65

2 Edmeades, DC et al (2010), The diagnosis and correction of potassium deficiency in New Zealand pastoral soils: a review, *New Zealand Journal of Agricultural Research*, 53: 151-73

GROWING GOOD BUGS

They're the unseen powerhouses of your soil, tirelessly working away beneath the cover of pasture. How best to support these vital bacteria, fungi and other miniature life forms?

Soils are teeming with life that can't be seen unless you have a microscope: bacteria – single-celled organisms that have probably existed on earth for around 3.5 billion years; fungi – multi-cellular organisms that periodically display their fruiting bodies above ground, where we see them as various types of mushroom; and protozoa – larger, more mobile and more predatory than other micro-organisms, but still invisible to the naked eye.

This life under the surface plays an important role in maintaining soil structure and soil fertility. One bacterial genus that is well-known to farmers is *Rhizobium*, which contains the species that are responsible for fixing nitrogen in association with legumes. Yet this is just the tip of the microbial iceberg. Some estimates suggest that there could be a million different species of bacteria in each gram of soil. And while we can't grow most of these (in fact, we can only culture around 1 percent of the bacteria we find in soil), we can see the effect that they have on the soil.

There are two key benefits of having a thriving microbial community in your soil: firstly, they decompose organic matter and in the process release nutrients that can be used by plants. Secondly, they produce substances such as polysaccharides, which act like a glue and help improve the structure of the soil. Without this microbial activity, soils would be incapable of supporting plant life, and farming as we know it would come to a grinding halt.

Maintaining soil conditions that favour microbial activity is definitely good for your farm, but how exactly do you do that? Unsurprisingly, soil conditions that are good for your plants are also good for your soil microorganisms.

The bacteria, fungi and protozoa that do good in your soil need the same things as your plants: air, water and food, plus a safe environment to live in. What they don't need are things like pugging, compaction, a disappearing topsoil or a low soil pH. Neither do they need a magic ratio of nutrients in the soil, or tiny amounts of organic substances, living or otherwise.

Pastoral farming is great for encouraging soil microbial activity, because as animals graze, they deposit dung – partially digested organic matter – back on the land. Ultimately, this becomes a food source for soil microorganisms, as does decaying plant matter, whether it's from crop residue or ungrazed pasture. New Zealand's agricultural soils generally have excellent levels of organic matter, thanks to our pasture-based farming system.

Soils with good levels of organic matter are more likely to have good structure, and this in turn helps ensure that the air and water levels are favourable for soil organisms. However, this can be undone by the injudicious use of heavy machinery, which could cause compaction, or by grazing strategies that result in pugging. In these cases, what you see on top of the soil – poor plant growth – reflects what's happening at a microbial level. When their ecosystem is disturbed so that soils become waterlogged and/or anaerobic, the microorganisms that normally thrive in a 'healthy' soil will struggle until conditions improve.

Most microbial action takes place in the rhizosphere – the area immediately surrounding plant roots. Farm practices that support strong, healthy plant growth will encourage greater root biomass, which means there's more places for soil microorganisms to live, which in turn will help sustain your soil, your plants and your farm. Focus on creating the best soil on earth, and the rest will take care of itself.

For more information on ways to improve and maintain soil fertility, talk to your Ballance Nutrient Specialist.

Follow these seven steps to help your soil microorganisms (and your farm) thrive:

- Maintain soil in the optimum pH range
- Maintain soil nutrients within the optimum range for your farm
- Return organic matter to the land
- Minimise cultivation
- Avoid pugging and compaction
- Protect topsoil from loss
- On land prone to flooding or waterlogging, improve drainage if possible

GONE FOR GOOD?

When you apply phosphate fertiliser, much of it becomes fixed to soil particles. But it's not gone forever . . .

The concept of phosphate fixation causes a lot of confusion at times and can also be a source of concern. The process itself is sometimes described as 'lock-up', a term that doesn't really do justice to the true situation.

'When soluble phosphate fertiliser is applied to the land, only a small amount is used straight away,' says Jim Risk, Nutrient Dynamics Specialist for Ballance. 'A small amount stays in the soil water, but the majority is adsorbed onto soil particles. It's important to realise that adsorption is reversible. The phosphate isn't locked away, it's just parked until it's needed.'

We can explain this concept with the help of a 24-pack of beer. Imagine you've just brought this home; you put four in the fridge and the other 20 in the pantry. Over the next few weeks you drink a beer a day, taking one out of the fridge and replacing it with one from the pantry.

The beer in the fridge represents the phosphate in the soil water that's ready for plants to use when they want it, and the ones in the pantry are the same as the phosphate that's been adsorbed to soil.

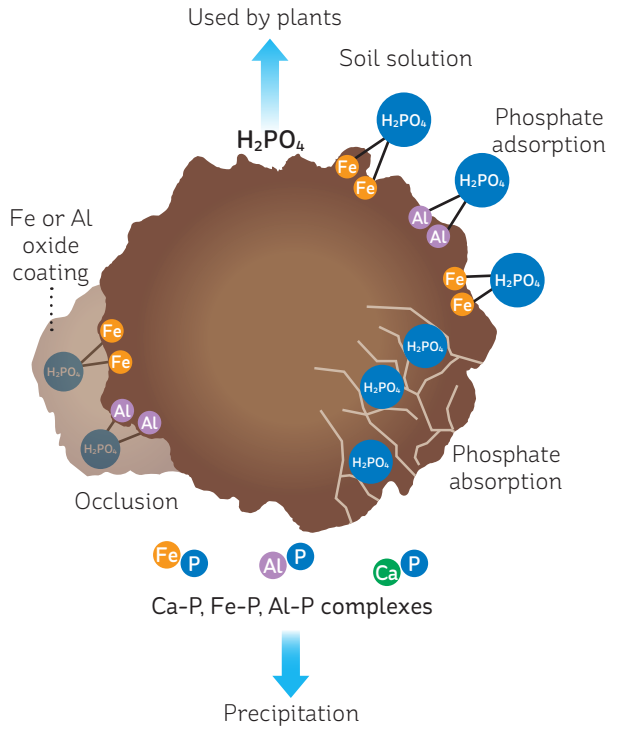
'We know from research that around 80 to 90 percent of the phosphate applied to soil will eventually be available to plants,' says Jim. 'A small amount will be lost by run-off – or by leaching in soils with a low anion storage capacity. And a bit of phosphate will become unavailable, either because it reacts with other minerals to form insoluble compounds, or because it gets covered with aluminium or iron oxides, which stop it from desorbing from soil particles.'

Phosphate fixation is actually a benefit for New Zealand farmers, because otherwise this vital nutrient would be at much greater risk of loss by leaching.

'The beauty of this store cupboard of phosphate is that you don't even have to do anything to release it – except grow grass or a crop. Phosphate likes to be at a certain concentration in the soil. As plants take up phosphate, the concentration falls, and so more adsorbed phosphate is released from soil to bring the levels back up.

'Of course, there are a lot of other things going on in the soil too, and these will have a small influence on the dynamics of phosphate release. But as a general rule, for most of New Zealand's farming soils, the best thing we can do to ensure good phosphate use is to maintain the soil so it grows good pasture and crops.'

For more advice on phosphate use on your farm, talk to your Ballance Nutrient Specialist.



The fate of soluble phosphate added to soil. Adsorbed phosphate is readily released; absorbed and occluded phosphate less so. Insoluble complexes precipitated out of solution are unlikely to become available for plant uptake.

Jim Risk

TESTS, TIPS AND TRICKS

Should you soil test? Yes. Should you herbage test? Yes. Should you do it yourself? Maybe . . .

Soil and herbage tests are a key part of good farm management. They are the only way to truly know the level of nutrients in the soil and the plants growing in it. Armed with this information, it's so much easier to maintain or improve pasture growth, minimise the chance of certain animal health problems and ensure the long-term sustainability of the farm.

'On the surface, soil and herbage testing looks pretty simple,' says Josh Verhoek, Ballance Science Extension Officer. 'But if you get it wrong, it could have some pretty significant consequences for your farm profitability. Get it right, however, and it can deliver some real, practical benefits for your business.

'With reliable soil test results we're able to develop a fertiliser recommendation specific to your farm, which means you won't spend money on fertiliser that you don't need. Accurate herbage tests help us unravel more complex nutrient issues that can't be diagnosed with soil test data alone. They do add a small cost, but the benefit of actually solving a pasture growth or feed quality problem far outweighs the price you pay.'

Taking soil samples

The most crucial step in getting accurate, reliable results from a soil-testing programme is establishing a sound sampling protocol. Any scientific test has a measure of variability associated with it – for example, if the error rate is 10%, then a result showing soil has an Olsen P of 30 means that in reality it could be 27 (10% less) or 33 (10% more).

Soil or herbage?

Before getting out an auger or plant shears, it's important to decide exactly what information is being sought. The table opposite outlines some common situations facing pastoral farmers and indicates whether a soil or herbage test – or both – is best used. If in doubt about which tests are required, consult an appropriate advisor. Your Ballance Nutrient Specialist will be happy to help.

Condition	Soil test	Herbage test
Fertiliser recently applied (two months)	X	X
Soil nutrient status unknown	✓	X
Macro-nutrient deficiency suspected	✓	✓
Trace element deficiency suspected	X	✓
Fertiliser recommendation desired	✓	✓
Plant health problem suspected	✓	✓
Plant nutrient deficiency suspected	✓	✓
Animal health problem suspected	X	✓
Fertiliser programme effectiveness unknown	✓	✓
Land use changed	✓	X

The biggest source of variability in any soil-testing programme is sampling error. For this reason, it's important to follow a few simple guidelines when taking soil samples:

- Don't take soil samples if fertiliser has been applied within the past three months as this will generate artificially high results
- Divide the land up into different areas based on soil type, topography, land use, fertiliser history, crop variety, pasture health. Sample each of these areas separately.
- For pastures and land that is direct drilled, use a 75-mm auger; for land that is to be cultivated, use a 150-mm auger as this corrects for the burial of fertile topsoil.
- Take 15 to 20 cores at each site, sampling randomly over the test area but avoiding areas with atypical nutrient status, e.g. fence lines, water troughs, dung and urine patches.
- Pool the samples from each site into a secure plastic bag and deliver to the lab as soon as possible. Do not leave sitting in a warm place as microbial activity will alter the nutrient levels.

Ballance reps use GPS co-ordinates to record the location of soil samples. This enables them to return to the same site year on year, even if fence lines or other points of reference have changed.

Taking herbage samples

Getting the right material is just as crucial when taking herbage samples, but it is more complex than soil sampling. Exactly what type of herbage sample should be collected is determined by the reason for the analysis. If you are trying to determine whether there is a micro-nutrient deficiency in pasture or a supplementary feed crop that is affecting animal health, then it's necessary to sample just the portion of crop that animals eat. In pastures, this means taking a mixed herbage sample.

On the other hand, if you are trying to determine if there's a nutrient deficiency that's affecting plant health, then a clover-only sample is best. This is because clover is more sensitive to nutrient stress than ryegrass. Grasses, however, are more sensitive indicators of nitrogen deficiencies.

The following steps will help ensure results of herbage testing are meaningful:

- Use clean shears or scissors to cut the herbage.
- Do not pull out plants by their roots and do not allow soil to contaminate the sample.
- Avoid sampling from atypical areas, e.g. around gates, fence lines, water troughs and dung and urine patches.
- Sample prior to grazing and preferably during the active phase of plant growth.
- Collect the sample from the total area of concern, pooling material to create a sample of around 500 grams.
- Carefully pack the sample in a clean paper bag (or a plastic bag with breather holes) and deliver to the lab as soon as possible. Plant material deteriorates rapidly - do not leave the sample sitting in a moist or warm environment.

Plant and soil samples should be clearly labelled so that when results are received from the lab it is obvious what they refer to. If in doubt about the interpretation of test results, consult your Ballance Nutrient Specialist. Keeping records of results will help build up a picture of the way land behaves with respect to fertiliser additions and product removal.

'When I went farming I fully intended to do all my own soil testing,' says Josh. 'But I was just so busy, there was no way I could even contemplate it. I just called up my Ballance rep and left it all to them. And that's what I'd recommend for most farmers – it takes a load off your plate and you know it's going to be done properly.'

Josh Verhoek

SUCCESS WITH SUMMER FALLOW

A regrassing model based on a summer fallow is a sound solution for non-performing paddocks.

The summer fallow approach, which was made popular in drought-ravaged Australia, conserves moisture and promises establishment certainty for the subsequent winter ryegrass or crop and beyond.

The productivity of a modern paddock is inherently tied to a finite life cycle, meaning that pasture will eventually 'run out'. Fertility and management interventions can help prolong a paddock's useful life, depending on the underlying reason for the loss of productivity. However, when a paddock is poorly performing and can't be brought up to scratch, regrassing is usually the only option. But since it is a costly exercise, it's important that it pays off.

According to Ballance Forage Specialist, Murray Lane, the summer fallow approach does just that. He acknowledges it raises the odd eyebrow, because leaving land to fallow for a month or two over summer feels counter-intuitive for most farmers. But that changes once they consider the fundamentals that underpin the concept.

Autumn regrassing

Regrassing is traditionally carried out in autumn and begins with spraying the paddock, with seed drilling a few days after that. Typically a winter-active ryegrass is sown after the runout pasture is sprayed out; then a spring sown summer- or winter-grazed crop, which is followed by new perennial pasture. However, after the summer dry, plant leaf availability may delay spraying, and lack of moisture may delay drilling.

The summer fallow, by contrast, starts with a glyphosate application in early to mid-January, optimising spray efficacy. Three days after spraying, the paddock is grazed one last time before it's left to fallow for six or so weeks, preserving soil moisture (dead plants don't 'pump' water).

Around March a second spray takes care of any residual weeds that have germinated and the paddock is ready to drill. The fallow has conserved soil moisture, enabling sowing in your time frame, not reliant on the drought breaking.

No plants = no moisture loss

The absence of plants over the summer months promotes what's perhaps most surprising - moisture conservation. Murray describes the underlying process as being akin to a pump that you can turn off. 'Living plants pump water out of the soil,' he says. 'Their roots remove moisture from deep in the soil and essentially lose it into the atmosphere.' When you take the plant out of the equation, the soil maintains much of its moisture and experiences only minor surface dehydration.

FACT: A paddock without plants over summer will have substantially better moisture levels compared to a paddock with pasture, given the same conditions.

Murray is passionate about the inherent value of this approach and points to associated benefits. Apart from being able to plan your sowing time because you have conserved moisture, and superior weed control, you have also set the paddock up for successful no-tillage cropping. He points to the obvious environmental advantage of direct drilling a crop or perennial pasture. 'Since phosphate is attached to soil particles, it is lost to the environment through sediment loss, which is made worse as a result of tilling. So you're helping to keep phosphate in place by not tilling,' he notes. 'In uncultivated ground, the soil structure remains intact, which inherently reduces the risk of losing sediment.'

Can you count on it?

The approach is easy to implement. There is a cost involved with any regrassing program, however Murray says that a summer fallow gives a good degree of certainty. Quite simply, the earlier sowing date results in more winter feed, while also setting the scene for better cropping in the spring. Besides, taking out a low-producing paddock in summer means your loss is only its marginal summer value.

FIGURE 1
The two soil samples above were taken in the same paddock in summer conditions after 8 weeks with no rain. The soil sample on the left had the vegetation killed, while the vegetation was left alive on the soil sample to the right. The two samples were taken 2-3 metres apart.

JANUARY

SPRAY OUT PADDOCKS

FINAL GRAZE

FEBRUARY

LEAVE PADDOCKS FALLOW

MARCH

SECOND SPRAY AFTER RESIDUAL GERMINATION

DRILL NEW PASTURE

The post-fallow value of the same paddock in May is vastly superior, with flourishing pasture (thanks to the benefits of moisture retention through the summer). It's self-evident that the summer loss is far preferable. The timing conveniently coincides with destocking for beef and sheep farmers. As for dairy herds, they may utilise the fallow paddock as a stand-off area, preventing over-grazing of summer pastures.

Pitfalls are few and far between, provided you get the timing right. 'Don't spray too early, otherwise annual broadleaf weed species like fathen, amaranthus and nightshade will germinate and require re-treatment,' says Murray. He suggests mid-January as being ideal for moist areas of the country, somewhat earlier in drier areas.

Compared to Australia, the summer fallow program isn't as yet widely adopted throughout New Zealand, but there's plenty of evidence of success, including a remarkable example in the country's driest zone in Marlborough, undertaken as part of a programme to introduce lucerne. While the moisture conservation is a major boon in dry zones and/or farms without irrigation, the principle ultimately works anywhere in the country.

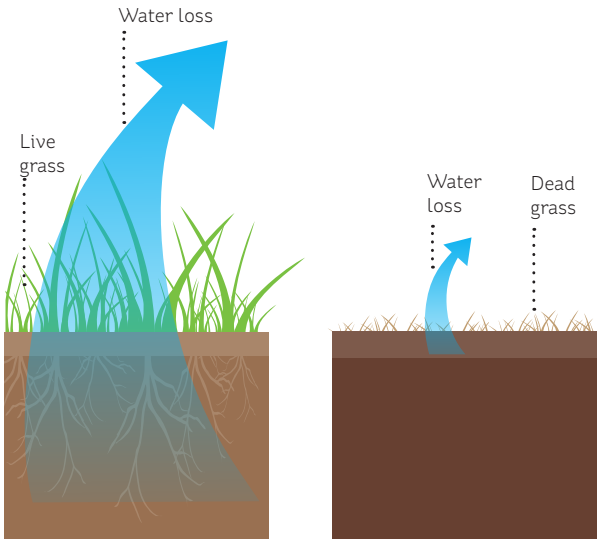


FIGURE 2
Living plants pump water out of the soil. When they die, the pump stops, so water is retained in the soil.

FEATURES AT A GLANCE	
Summer Fallow	**No Fallow**
• Sacrifice poor summer paddock productivity • Improve moisture retention ('stop the pump!') • Sowing date can be determined • Drilling in March for better plant establishment • Effective control of perennial weeds using two autumn sprays	• Utilise summer paddocks but miss out on optimising soil moisture for sowing • A dry summer can delay spraying and drilling (glyphosate needs a mature plant above ground) • Later sowing time means slower plant establishment and poorer winter pasture

HILL COUNTRY CROPPING BY AIR

Few farming scenarios are more daunting than growing crops or renewing pasture on steep farmland inaccessible by tractor. However, a series of concept trials suggest that helicopter-assisted methodologies can be economically and practically viable for achieving improved productivity in hill country.

In the early 2000s, four hill country farming sites in Pikowai, Kaiwaka, Waitomo and Te Akau were the scene of proof of concept trials. Initiated by farmers in association with Northern North Island Sheep Council, the study evaluated practical techniques for a pasture renewal programme without land-based equipment.

Study co-author and Ballance Forage Specialist, Murray Lane, explains that two options were investigated. 'Firstly a summer fallow using Roundup® herbicide, and secondly a summer forage crop of Pasja and chicory followed by sowing new pasture.' All activities were exclusively carried out by helicopter.

The summer fallow trials started with an application of Roundup® in late December/early January; capital fertiliser was applied afterwards, followed by re-application of Roundup® in March/April to eliminate remaining perennial species and germinating weed seedlings. To minimise helicopter ferrying costs all treatments were applied on the one day: first Roundup®, then slug bait and seed, followed by the DAP fertiliser (200-300 kg/ha) in a third pass.

While timing and amount of rainfall was different at each site, good moisture conservation was evident. 'It's a direct result of the summer fallow, because dead plants don't pump water,' notes Murray.

The second trial series – a summer crop – involved an initial application of Roundup® plus insecticide in October/early November, again by helicopter. Application of DAP fertiliser (400-500 kg/ha) on its own was followed by slug bait and crop seed mixed. Murray highlights two factors for success: firstly, the slug bait - it's as important as the seed; secondly, a good rate of DAP for early seeding growth.

The seed option used was Pasja mixed with chicory: this mix precluded a crop-selective herbicide option. However, it was observed that the chicory did particularly well in wet areas, while Pasja favoured drier areas, so together they offered significant weed suppression.

The area was grazed until the autumn rains in April/May, before being sprayed then oversown with treated perennial pasture seeds along with another application of DAP fertiliser (and slug bait if a wet season).

While running stock traditionally helps to improve seed-to-soil contact, the study found it to have little effect on plant establishment. DAP broadcast near the seed, by contrast, proved significant for seedling establishment.

The authors say the study provides great insights. They hope to stimulate industry-wide discussion about effective hill country cropping and pasture renewal. Critical factors include addressing capital fertiliser and lime requirements in advance, applying DAP at sowing, selecting a site-appropriate crop and adopting adequate pest control measures (especially for slugs and springtails). Provided key activities are not overlooked - or eliminated to cut costs – the system works.

'Our trials have confirmed that aerial spraying can indeed be used to establish crop and pasture species,' says Murray. 'Given judicious use of helicopter time, both a summer crop and a summer fallow renewal are economically viable.'

Hill country regrassing using summer fallow by air – key activities

- Spray Roundup® in January
- The 'pump' stops
- Apply lime and capital fertiliser as required
- Repeat Roundup® spray after 6-8 weeks
- Sow treated seed and slug bait; apply DAP
- Commercial cropping results have been achieved at around $1000/ha

GET IN EARLY

Applying nitrogen fertiliser early, even in less than ideal conditions, can be an economic way to meet early spring feed deficits on hill country.

'Your need for extra feed is going to peak in late winter or early spring,' says Ollie Knowles, Ballance Precision Agriculture Specialist. 'To boost pasture with nitrogen, you need to get it onto your paddocks at least three to four weeks before you want the feed. This means you could be applying it when conditions are less than ideal - soils might be wet and cold, and pastures relatively slow-growing.

'The point to remember is that it's often the *timing* of the pasture response, not necessarily the scale of it, that will determine its ultimate value. Feed generated on-farm to meet a peak demand is worth much more than feed generated when there are fewer limitations to growth.'

Information from the 'National Wise Use of Nitrogen Focus Farm Project' showed that applying nitrogen in less than ideal conditions could achieve reliable responses, albeit variable in size. 'When soil temperatures are below six degrees Celsius, pasture response to nitrogen will be minimal,' says Ollie. 'As the soil warms up, you can start to apply nitrogen. While it's still cool (but above the minimum of six degrees Celsius) you'll get a nitrogen response, although obviously not as much as you'll get later in the season, when growing conditions are much closer to ideal. Nonetheless, early applications will help you meet that peak feed demand.'

Modelling work has shown that the breakeven from a nitrogen application in early spring is 6 kg DM/kg N – which is a low-response situation. However, on many farms, responses of 10 kg DM/kg N can confidently be expected in early spring, meaning the additional feed grown costs approximately 10 cents/kg DM.

Context is obviously important. In the focus farm project, the gains for sheep farmers were attributed to more ewes per hectare weaning more lambs per hectare because of higher stocking rates. Lamb liveweight at weaning was similar across treatments, whereas with cattle there was more liveweight gain per hectare when nitrogen was used. 'On the other hand, the project indicated that using nitrogen tactically to feed existing stock was a less risky strategy than using it to increase stock numbers.'

Comparing rates of nitrogen applied on the hill country focus farms showed that lower rates (less than 100 kg N/ha) were generally more profitable than higher rates. 'This also minimises environmental risk,' says Ollie. 'AgResearch trials have shown that using high rates of nitrogen (more than 100-200 kg N/ha) to grow more feed is liable to increase nitrate leaching losses on hill country.

'Choosing the right product is also important; you want to match the environmental conditions and address any other potentially limiting deficiencies – usually sulphur on hill country – without cutting into the profitability of the exercise.'

For more information on nitrogen planning for hill country, talk to your Ballance Nutrient Specialist.

ANIMAL

PLANT

LAMBS IN CLOVER

For fast-growing lambs, the quality and quantity of feed is important. Clover delivers excellent feed value, so it's worth looking after.

Heavier weights, earlier slaughter dates and less chance of lambs being sold on the discounted store lamb market – these are aims common to most sheep farmers. Two factors dominate the likelihood of these goals being achieved – the genetics of the stock, and the nutrition that the animals receive.

'Liveweight gain is affected by both feed quantity and quality,' says Josh Verhoek, Ballance Science Extension Officer, 'but it's the nutritive value of the feed being consumed that will have the greatest impact.'

Clover is generally considered the best quality component of grazed pastures, thanks to its higher concentrations of protein and readily fermentable carbohydrates. Clover is less fibrous than grasses, which makes it more palatable and more easily digestible. As a result, an adequate level of clover in pastures grazed by lambs can help boost liveweight gains.

'Getting good levels of clover content in pastures isn't a matter of chance,' says Josh. 'There are some straightforward management techniques that can be used to help build clover content, and these will work provided the local climate's suitable for growing clover.'

Good soil fertility is essential.

'Clover is more sensitive to its growing conditions than ryegrass,' notes Josh, 'so whatever you do for clover will benefit the pasture as a whole. Aim to maintain soil pH in the optimum range – around 6.0. Make sure your Olsen P, Quick Test K and sulphate sulphur soil test results are at the target for your soil type, and that clover herbage molybdenum levels are adequate.

'Use nitrogen strategically. It's true that excessive use of nitrogen can reduce the percentage of white clover in the sward, but that's only at high levels. If you keep the total annual application less than 200 kg N/ha, the impact on clover should be minimal. Little and often is the key.'

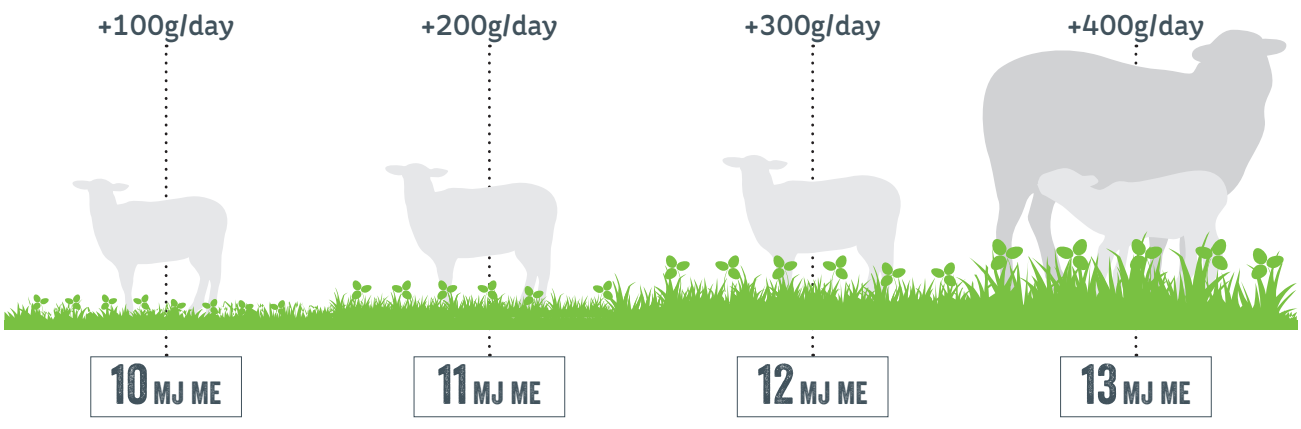
However, good fertiliser strategies alone will not ensure the survival of clover – pasture management also needs to be considered.

'Clover likes a relatively open pasture,' says Josh. 'It doesn't like being smothered by aggressive spring growth. A good grazing strategy will help keep clover dominance in the sward. The best time to graze is when pasture covers are around 2400 kg DM/ha. This sort of cover is when you get the best growth without compromising quality.

'If you can't graze then, consider other ways to manage the pasture – topping on flat paddocks, for instance, or shutting up paddocks for surplus feed.

'There are other ways of increasing pasture quality, too. You can introduce a crop to take pressure off the pasture, or you could feed high-energy concentrates, which will have a similar effect. In high-value paddocks, actually measuring and monitoring pasture growth is also important – we tend to rely on the "eyeometer" a fair bit, and that's generally not so accurate. You could always adopt a dairy strategy and use plate meter readings, which will give you a much better measure of the amount of feed on hand. If you use this information to build a feed wedge, then you can be a lot more strategic about working towards that 2400 kg DM/ha target.

'The approach you take will depend very much on your farm. It's worth talking to your Ballance Nutrient Specialist to see what advice they have for managing clover content to maximise lamb growth rates this season.'



The daily weight gain of lambs is directly related to the value of their feed. Dead plant matter has less than 8 MJ ME; young growing stem has around 10 MJ ME; good-quality clover leaf has 11.5-12 MJ ME, and ryegrass is similar. Ewes' milk provides 13 MJ ME

SOIL PH FOR FODDER BEET

The high yield and good energy level of fodder beet makes this relatively new forage crop an increasingly popular alternative to brassicas as part of cropping rotations or pasture renewal. However, it requires focused attention on ideal growing conditions – not least the right soil pH - to achieve the promised returns.

The popularity of fodder beet hasn't waned since its introduction to New Zealand about a decade ago. Mind you, success was destined for this very palatable forage crop with a bulb that has a metabolisable energy level of 12 MJ ME. Moreover, it easily attains high yields – around 30 tonnes dry matter per hectare is quite achievable, depending on where you are in New Zealand.

With the addition of a high-protein supplement (to compensate for its relatively low protein level) fodder beet is an ideal production feed. It can be readily grown up and down the country and will provide ample rewards for those who follow good practice pertaining to conditions in New Zealand. The emphasis on local conditions is particularly relevant, as information from overseas research has caused some confusion, especially where the soil pH is concerned.

As one of the key members of the Fodder Beet Agronomy Group, Ballance is involved in extensive research to determine the ideal soil properties and nutrient levels to grow fodder beet.

So what's the ideal pH?

'The information that we have so far suggests that fodder beet requires a soil pH of 6.0–6.2 in the top 150 mm of soil,' says Ballance Science Extension Officer, Aimee Robinson. 'This is now also recognised as industry-agreed best practice, which should provide clarity and guidance.' Incidentally, the target also corresponds with the ideal pH level for sowing pasture after the crop has been grazed.

Where tests show that soil is more acidic than this, an application of lime will be needed to adjust the level. Aimee emphasises that fodder beet is very sensitive to low soil pH levels, hence the need for timely soil testing.

'It's critical that tests are carried out a minimum of six months before sowing because it takes at least that long for lime to dissolve and have an effect on the soil. Ideally, we recommend testing 12 months in advance,' she says. Earlier testing also allows you to correct any other nutrient levels before applying a suitable base fertiliser.

An application of good-quality ag-lime is recommended, with the rule of thumb being 1 tonne per hectare to raise the pH by 0.1 unit. Equally important is the need for lime to be well incorporated throughout the top 150 mm of soil, which may need cultivation.

Pay attention to the target pH soil level as well as overall crop management and fertiliser requirements and you'll get the most out of this high-value crop.

For further information talk to your Ballance Nutrient Specialist.

Focus on nutrition

SealesWinslow's Fodder Beet Block is specifically formulated to provide optimum dietary support for stock grazing on fodder beet.

- Provides dietary phosphorus to supplement the lower levels found in fodder beet and to prevent deficiencies (vital for bone strength, energy metabolism, milk production)
- Contains magnesium to boost winter health
- Provides trace elements (cobalt, copper, iodine, selenium, zinc) that may be in low supply

The blocks are convenient to use, palatable and will be wholly ingested without any wastage

MIXED MESSAGES

If incompatible fertilisers are blended together it can affect the quality of spreading, product performance and, in some cases, create a health and safety risk.

'Ballance's quality control processes minimise the chance of a bad combination going out, but it pays to be aware of incompatibilities if you are also incorporating products from other consultants or merchants into your fertiliser programme,' says Ollie Knowles, Ballance Precision Agriculture Specialist.

There are two areas to consider – physical and chemical incompatibility. 'If blending guidelines are ignored, there are a number of possible outcomes. If the mix attracts moisture or combines products that segregate due to variations in particle size, it will be hard to spread evenly, which means uneven results. This can show up as stripes in pasture or crops and is of particular concern in high-value horticulture or cropping businesses.

'If the components of the mix react chemically, at best it's going to reduce product quality and effectiveness. At worst it can create a fire risk and/or generate ammonia gas, which can be very hazardous at high concentrations. It definitely pays to check special mixes very carefully and to keep chemical properties in mind when storing and handling fertilisers before use. Keep bags sealed; keep potentially flammable products away from any ignition source and store products likely to react well away from each other.'

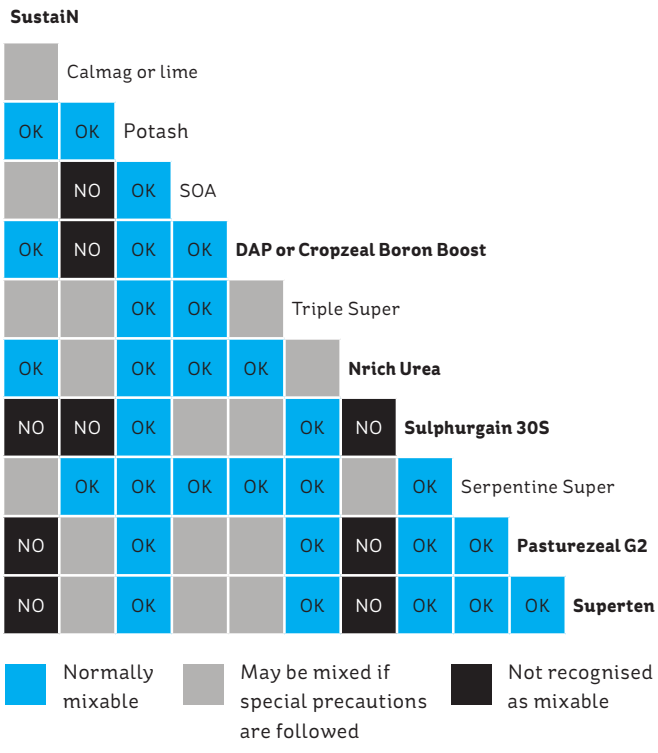
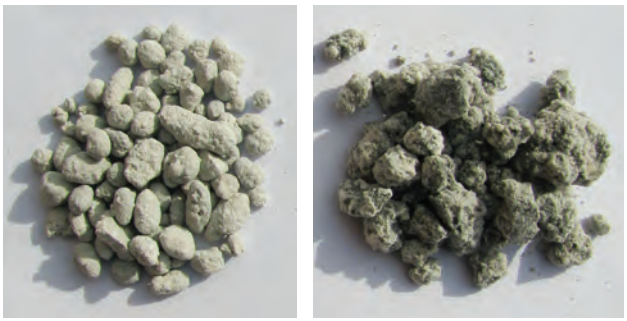


FIGURE 1
Guide to chemical compatibility of Ballance products



If mixed with urea, superphosphate (left) can cake or turn to sludge (right)

Chemical incompatibility

The 'common' problems created by incompatible mixes are:

Moisture: Some products are hygroscopic (meaning they attract moisture from the air), so that mixes containing them cake or turn into sludge. Blends of nitrogen-based fertilisers and super-based products are prone to this.

Heat: Many super-based products contain a small amount of free acid. If these are mixed with lime-based products the free acid and alkaline lime react, creating moisture and heat, which affects product quality and spreading.

Ammonia gas: Highly alkaline products such as Calmag can generate ammonia gas if blended with ammonium-based products like sulphate of ammonia (Nrich SOA) or DAP. Ammonia gas can be harmful if inhaled at high concentration, which could happen if it has accumulated in a confined space such as under a tarp during transport or storage.

Fire hazard: Some products – notably fine-ground elemental sulphur – have a low ignition point. These must be mixed in the right proportion to avoid heat/static from the plane or handling causing it to catch fire. They should also never be mixed with strong oxidizing agents such as potassium nitrate or calcium ammonium nitrate.

Research is constantly changing our understanding of product compatibility. If you have any questions, contact your local Ballance Nutrient Specialist, ring our Customer Service line (0800 222 090) or talk to local store staff.

CLIPPINGS

It's true that OVERSEER outputs could be used for regulation, but that's not why the software was developed. The real purpose of OVERSEER is to provide farmers with advice on nutrient management for their farms. It's designed to provide information that will help farmers manage their nutrient use (fertiliser inputs) and increase nutrient-use efficiency. It can also be used to identify nutrient-loss hotspots on the farm and to investigate 'what will happen if I . . . ?' scenarios. With the power of OVERSEER, New Zealand's farmers are in a much better position to make informed decisions about nutrient management on their farms.

THAT'S A NUISANCE!

Pests and weeds are – well, a pest! AgPest™ on the other hand, is a free tool to help New Zealand farmers with weed and pest identification and management.

A free-to-use website - agpest.co.nz - AgPest was developed by AgResearch, in association with a range of sponsors, including the Fertiliser Association.

A simple series of questions will help you identify the pest or weed that's plaguing your property, and photos will help to confirm your answer. Once you've identified the pest or weed, you can read about its characteristics, biology and impacts. Then, importantly, you can see what sort of options are available for control.

AgPest is free to use, but if you register you can opt to receive alerts, so you'll be on top of all the latest pest news. You can also follow AgPest on Facebook.

SPREADING YOURSELF?

If you spread your own fertiliser, then you'll want to make sure it's going on at the designated rate – underapplying product won't benefit your production, and overapplying it won't benefit your budget. The best way to avoid inaccurate application rates is to calibrate your equipment.

Fortunately, help is at hand, in the form of the FertSpread website, fertspread.nz

The FertSpread website allows you to calculate the size guide number (SGN) and uniformity index (UI) of your fertiliser, plus the fertiliser flow rate, required spreader speed and actual application rate (kg/ha). Importantly, it also allows you to analyse your broadcast spreader configuration and optimise your bout widths, so that you can be confident of getting consistent, cost-effective spread patterns wherever possible.

FertSpread is free to use – simply register to access all of the information you require, including videos showing exactly how the testing is performed.

DID YOU KNOW?

- The maximum accepted coefficient of variance (CV) for nitrogenous fertilisers is 15%
- The maximum accepted CV for non-nitrogenous fertilisers is 25%
- FertSpread can tell you the CV for the bout width and fertiliser product you're testing

FOLLOW US!

Did you know that Ballance is on Facebook?
Follow us and be among the first to hear about our news, competitions and other goings on. We've got loads of photos of visitors to our marquee at this year's National Fieldays, too – take a look and see who you recognise.

AFTER WEANING, WHAT NEXT?

Paying attention to feeding and weight gain after weaning will reduce empty rates and help keep milk production levels on target.

Prior to weaning, calves receive considerable attention: there is a lot of good work done to ensure they grow from birth to 100 kg in the best condition. The calves are well managed, there is a lot of attention paid to their health and nutrition, and in the majority of cases, weight gain is carefully monitored.

Unfortunately, the growth period between 100 kg and the first calving typically receives less attention. When this happens, heifers are more likely to be underweight and unable to perform to their potential in the herd.

'If you're trying to get the best production for your farm, then monitoring weight gain in young stock is a good place to start,' says Wendy Morgan, SealesWinslow Nutrition and Quality Manager. 'To do this, you need a target and a feeding strategy to help your animals reach that goal on time. Depending on breed, you could be aiming for a gain of at least 600 grams per day in the first three to six months of this programme.'

The first step is getting calves weaned as soon as possible after they have hit their rumen development and weight targets. Pasture is the cheapest form of feed, so the sooner that dominates the diet, the better for your farm economics. However, pasture alone may not be sufficient.

'Before weaning, when calves are on meal, they get the exact minerals they need for growth and development,' notes Wendy. 'When the meal's removed, there's no guarantee that pasture will provide the minerals and energy the stock require.

'Fortunately, mineral supplementation of young stock is quite easy. We can use molasses blocks like Crystalyx Forage Plus or SealesWinslow Young Stock Blocks. These are highly palatable and easy to use, which is really important at this time of the year. The minerals in these blocks will help support the development of the skeleton and rumen, and also support muscle growth.'

Alternatively, water can be dosed with minerals, using a product such as Micromax.

'Stock that have high-quality pasture and appropriate mineral supplementation should have no problem gaining the correct amount of weight,' notes Wendy. 'However, the only way to judge this is by regular weighing. Ideally this would be done with scales, but we know that's not always possible. If scales aren't available, then weigh bands can be used. They're not as exact, but if you're consistent with your technique they will give you a general idea of progress.'

For more information on strategies to hit your weight gain targets this season, talk to your SealesWinslow representative.

Does it work?

An AgResearch study showed that using Crystalyx Forage Plus with R2 heifers resulted in a 5% increase in conception rate.[1] Furthermore, the conception date of these heifers was 4 days earlier than stock that did not receive Crystalyx Forage Plus. Stock receiving the supplement also had higher blood levels of some minerals, notably selenium and magnesium.

1. Lee, R & Rennie, G (2011) Crystalyx Forage Plus: a nutritional supplement for breeding age heifers, Report prepared for Ballance Agri-Nutrients

STOP THE DROP

Minimise the inevitable summer drop in milk production with the strategic use of nitrogen and high-energy supplements.

It's a pattern that's seen on dairy farms all over the country: after the peak milk production in spring, volumes start tailing off, and week by week there is less and less in the vat.

Some of this decline is due to the physiological changes that the cow is going through – pregnancy and lactation stage, for instance. Some of it is a consequence of the reduced growth rate of pasture, which results in less dry matter being available for grazing. And finally, some of the decline results from the changes in pasture quality that occur as spring rolls into summer.

'If we look at the numbers associated with each of these factors, we can see that a 4-6 percent production decline per month results from the physiological changes in the cow,' says Paul Sharp, SealesWinslow Animal Nutrition Specialist.

'Yet the average production decline on New Zealand dairy farms is close to 15 percent per month. The difference between these figures – 9-11 percent – comes from the impact of the feed quality and quantity.'

In late spring and early summer, pasture quality declines because grasses change from vegetative growth (where they are producing leaf) to reproductive growth (where they're producing seed head). This increases the fibre level in the grass – and therefore the animals ingest more fibre in their diet.

Dietary fibre has two effects: it's less digestible, so the energy intake of the animal is reduced; and it slows the speed at which the animal can harvest pasture and process it through the rumen, which means the animal feels full after eating less. The overall outcome is that animals consume less pasture and get less energy each day, which naturally curtails their ability to produce milk.

Action stations

'The more we can minimise the impact of falling pasture quality and quantity, the more milk we'll be able to produce through spring and summer,' notes Paul. 'Ideally, we only want to see a 5 percent drop in production each month.'

Managing grazing to optimise pasture quality is paramount. 'Adjust the rotation so that you're grazing pastures when the plant is still young. That way there will be less seedhead and stem – and therefore less fibre - in the feed. If you need to, use other stock classes to clean up older pasture, or shut up paddocks for silage or hay.'

Pasture growth can be promoted by the use of regular, light dressings of nitrogen fertiliser; just 15-18 kg N/ha will be enough to encourage leaf growth.

'At the same time, you can increase the energy density of the animal's diet by using high-energy supplements,' says Paul. 'These can just be used strategically to fill that energy gap and keep milk production levels up. SealesWinslow's Hi Starch pelleted feed is ideal for this use.'

To see how you can keep your milk production losses to a minimum this season, contact your SealesWinslow rep for more information on summer feeding strategies.

Fibre facts

- Fibre is an important component of plants as it gives the cells strength, which allows the plant to grow vertically
- In order to compete with surrounding plants, grasses produce more fibre so that the plants are pushed up towards the light
- Fibre is measured as ADF (acid detergent fibre) and NDF (neutral detergent fibre)
- ADF is the less digestible of the fibres, and includes lignin and cellulose. The higher the ADF, the lower the energy of the feed
- NDF is more readily digestible and includes hemicellulose. The higher the NDF, the lower the dry matter intake will be

FACIAL ECZEMA HEADING SOUTH

Long a problem for North Island farmers, facial eczema is being seen further and further south. Fortunately, zinc can help reduce its impact.

Facial eczema results from stock ingesting spores of *Pithomyces chartarum*, a fungus that is found in many pastures. Until recently, it's one problem that South Island farmers haven't had to deal with, but it's now well established in Golden Bay, and last season there were outbreaks on the West Coast. Since it appears that the fungus is able to survive in South Island conditions, it's worth keeping this condition on the farming radar.

Conditions that favour spore production generally occur in summer; the fungus thrives when soil temperatures exceed 12 °C for three consecutive nights and there is either humidity or some degree of soil moisture. Local spore count information is generally provided by veterinarians and data is usually available online.

As spore counts increase, so does the chance of animals developing clinical symptoms of facial eczema. However, counts can vary, so it's important to look at the overall trend, rather than focus on a specific number on any given day. Commonly, the risk of facial eczema increases when spore counts are trending upwards and exceed 20,000 spores/gram.

Spore counts will vary from paddock to paddock, so stock could be exposed to varying levels of risk through the rotation. Paddocks with more dead matter tend to have higher spore counts, as this helps to trap moisture and provides ideal growing conditions for the fungus.

Pasture management

Good pasture management will keep dead matter levels low. Matching the rotation to feed supply will help ensure that grass growth is optimised. When grass becomes too long, dead matter can accumulate at the base of the sward, which will increase the facial eczema risk. A similar effect happens if paddocks are topped.

Think zinc

'Zinc supplementation is generally regarded as the key to preventing facial eczema,' says Natalie Hughes, Science Extension Officer for SealesWinslow. 'Clinical cases of the disease usually arise because spore counts are high and zinc supplementation is inadequate or absent.

'The amount of zinc needed to combat facial eczema is dependent on the liveweight of each animal, so it's critical that doses are adequate for the weight of your stock.'

It also takes time to build up protective levels of zinc in the animal. Zinc dosing should start two or three weeks before spore counts start to rise and then continue through the season. 'In some cases, that might mean starting supplementation in December,' says Natalie.

Zinc can be offered to animals in various ways. It can be sprayed on pasture, dispensed in the water, given in boluses or mixed into feed.

'When zinc is added to water, cows can be reluctant to drink it due to the bitter taste,' says Natalie. 'However, if you use ZincMax+, this isn't an issue, as it has a peppermint flavouring that helps to overcome the bitterness. It's important that zinc-treated water is palatable, otherwise stock won't take enough to get the amount of zinc they need for protection.'

Zinc dosing needs to be continued through the facial eczema season, which can cause cows' copper levels to become depleted, as the cows end up absorbing less copper from their diet. 'This can be overcome by using a product like ZincMax+, which contains organic copper and so helps to offset the effect of the zinc.'

For more information on using ZincMax+ to prevent facial eczema, contact your local SealesWinslow representative.

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Melanie Segerstrom

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