Grow east coast

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THE NEWSLETTER OF BALLANCE AGRI-NUTRIENTS LIMITED SUMMER 2011/2012

Research for a brighter future

Imagine being able to reduce the amount of fertiliser you put on your land, while still maintaining your production targets. Imagine being able to choose a natural, biological pest control agent, instead of only having chemical means at your disposal. Imagine knowing with certainty that you will be handing your children a farm that both provides income and nurtures the environment in a truly sustainable manner.

It was this type of vision that helped Ballance secure a $9.75 million grant from the Government's Primary Growth Partnership, money that the co-operative will match dollar for dollar over the next seven years. When combined with Ballance's normal planned investment over that period, this totals $32 million of research and development funds being invested into nutrient management science.

The research programme will address four areas that have critical importance for our farmers, and will be carried out in collaboration with some of this country's best scientists, each with specialist expertise and experience.

Nutrient use efficiency

One focus is on nutrient use efficiency – or how to get more from less. How do we stop or reduce the loss of nitrogen from volatilisation and leaching? How can we stop so much fertiliser phosphorus forming complexes with various components of soil (the so-called 'locking up' of nutrients)? How can we better free up the nutrients that are in the soil, so that they can be used more effectively by pasture and crops? Answers to these questions will guide the way to the development of products and services that will enable farmers to reduce fertiliser use – an important goal, given that ultimately, these resources are limited.

Environmental protection

A second – and related – focus is on environmental protection. How do we minimise the environmental impact of nutrient loss from fertilisers and farms, particularly with respect to lakes, rivers and streams? Currently, even the best practices will still see some nitrogen and phosphorus enter waterways, albeit at low levels. If product formulations and characteristics could be manipulated to drastically reduce the ability for products to migrate into waterways, then our environmental management would take a significant step forward. Achieving this will help to ensure that farmers are able to operate within some of our more vulnerable catchments, and will also help to secure international acceptance for our products. This will be of particular value in the high-end markets, where customers demand quality of product and of production.

Biological solutions

The third area of focus looks out of the box and into a future where today's normal practices have been supplemented with some alternative offerings. This research programme will look at how the soil microflora can be harnessed to deliver solutions to common farming challenges. Can we find soil fungi and bacteria that will complement fertilisers by enhancing nutrient uptake in a real-farm environment? Are there naturally occurring micro-organisms that will control some of the more common pasture and crop pests that currently affect productivity? Delivering such biological solutions will give farmers a choice in the way they operate, and will help reduce the country's reliance on imported products.

Sharing the knowledge

Generating information is no use if it is not converted into knowledge, and knowledge is no good unless it is shared with those who need it. To achieve this, Ballance will work in collaboration with other knowledge providers and extension specialists (e.g. DairyNZ, Beef + Lamb, FAR), to show farmers exactly how these advances can benefit their business, both from an agronomic and economic perspective. Discussion groups, field days and on-farm demonstrations will all help to ensure that our farming industry and our economy benefit from this significant investment by both Ballance and the New Zealand Government.

The company's successful bid for Primary Growth Partnership funding was led by Head of Research and Environment, Warwick Catto and GM Agro-Sciences, Willie Thomson

Know your nitrogen needs

Article supplied by Jeff Morton, Ballance technical consultant

Your nitrogen fertiliser strategy plays an important role in determining not just the yield of your brassica crop, but also the profitability of that crop. Getting it right involves knowing what you've started with and how much you can expect to use during the growing season.

Thanks to a decade-plus of research and in excess of 30 field trials we now have a scientifically validated decision support tool (the Ballance Brassica Calculator) that can be used to model the way New Zealand's brassica crops respond to nitrogen, phosphorus and potassium, and to show the economic consequences of those responses.

The calculator can be used pre-planting to determine starter fertiliser requirements, and it can also be used later in the season to model the effects of different post-emergence nitrogen strategies and to reflect the impact of seasonal and site factors on crop development. How closely you can match nitrogen inputs to yield potential will have a significant impact on the economic outcome of your crop, so it's a good idea to ask your Ballance rep to help you model nitrogen needs, using the Ballance Brassica Calculator.

Calculating the odds

How much nitrogen you need to apply post emergence depends on a number of factors:

- Previous use of the land – land that has come out of pasture will have higher nitrogen reserves than land that has come out of crop. The more nitrogen that is available from soil reserves, the less needs to be applied in fertiliser.
- Expected crop yield – soil fertility, crop type, cultivar, moisture availability and accumulated heat units all affect yield potential, as do weed, pest and disease factors. The more favourable all of these elements, the greater the likely yield, and the more nitrogen that is required to deliver on that yield potential.

As total crop yield increases, the economic consequences of applying more nitrogen become advantageous. The return from the crop increases and the cost of the nitrogen inputs decreases accordingly. Get it wrong, though, and the additional nitrogen will end up costing you money that is not returned in crop value.

The examples below have been developed using the Ballance Brassica Calculator. They are based on data that shows that land coming out of pasture supplies around 200 kg N/ha and land coming out of crop supplies around 100 kg N/ha. The examples assume that Olsen P levels are in the 15-20 range, that appropriate levels of boron have been applied, that we experience a warm, moist season that gives at least average yields, and that the grower uses appropriate pest and weed control.

These examples clearly demonstrate how much variability there is in the optimum nitrogen application for each situation, and they emphasise the importance of getting good advice, in order to get the best agronomic and economic return from your crop.

Crop		Paddock history	Yield (t DM/ha)	Post-emergence N required (kg n-rich or SustaiN Green/ha)*	Timing of N application(s)
	Kale	Ex-pasture (Available N high - 200 kg/ha)	10	0	
			15	0	
			20	100 kg/ha	At canopy closure
		Ex-crop (Available N medium - 100 kg/ha)	10	0	
			15	150 kg/ha	At canopy closure
			20	300 kg/ha	Half at canopy closure and half by end of February
	Swedes	Ex-pasture (Available N high - 200 kg/ha)	10	0	
			15	60 kg/ha	At canopy closure
			18	150 kg/ha	At canopy closure
		Ex-crop (Available N medium - 100 kg/ha)	10	100 kg/ha	At canopy closure
			15	200 kg/ha	Half at canopy closure and half by end of February
			18	300 kg/ha	Half at canopy closure and half by end of February
	Turnips	Ex-pasture (Available N high - 200 kg/ha)	8	0	
			10	0	
			12	60 kg/ha	At canopy closure
		Ex-crop (Available N medium - 100 kg/ha)	8	60 kg/ha	At canopy closure
			10	100 kg/ha	At canopy closure
			12	150 kg/ha	At canopy closure

*Assumes starter fertiliser of 200 kg DAP/ha has been used for all instances, except kale yielding 10 t DM/ha out of pasture, swedes yielding 10 t DM/ha out of pasture and turnips yielding 8 t DM/ha out of pasture.

Where is your nitrogen going?

Article supplied by Jeff Morton, Ballance technical consultant

You can't see when the nitrogen you apply is being lost by volatilisation, but that doesn't mean it's not happening. Using the right product can reduce this loss and provide a positive economic benefit.

Nowadays, most farmers have heard of nitrate leaching, and they have a good idea of the conditions that favour this, and steps they can take to reduce their losses. However, there has been much less discussion about nitrogen losses through volatilisation – possibly because it doesn't have the same environmental consequences. That doesn't mean it's not important, especially as it can have economic consequences.

Vol-at-il-i-what?

Volatilisation is the loss of nitrogen in the form of ammonia gas. It occurs as a result of a natural enzyme in the soil acting on urea (whether that urea is as fertiliser or in urine). The enzyme involved is called urease, and it's present in all New Zealand soils.

The loss is accelerated by the very localised elevation in soil pH that occurs just around the urea granule. As the soil pH around the dissolving urea granule increases (i.e. becomes more alkaline), the amount of volatilisation increases. Because this reaction occurs in the immediate vicinity of the urea granule, the pH of the soil as a whole is irrelevant – if your soil is pH 6.0, volatilisation will still occur, because the pH around the urea granule will temporarily be much higher.

The action of the urease enzyme ultimately results in the production of ammonia. This is a gas, and so it will dissipate into the atmosphere, taking with it some of the nitrogen that you paid for in your urea!

For better or worse

The conditions that exist before and after urea application influence the degree of volatilisation that will occur.

Moisture is a key factor, both before and after urea application. If it rains before you apply urea, the urea goes onto moist soil and will start to dissolve; however, because it won't migrate down into the soil, the risk of volatilisation losses is increased. (If it rains sufficiently after application, this risk is negated, but the chance of nitrate leaching increases).

If the soil is so dry that urea granules can't dissolve into it, then there will be no ammonia volatilisation loss. Once sufficient rain (or irrigation) occurs, the urea will dissolve and enter the soil. If there's insufficient rain, volatilisation losses will still be an issue.

A worst-case scenario for ammonia volatilisation would be a dry soil combined with high atmospheric humidity, a morning dew or light rainfall (< 5 mm). All of these scenarios would supply enough moisture to dissolve the urea granules, but insufficient to take the urea down deep enough in the soil to prevent volatilisation.

The rate of urea application is also important. At higher rates, the granules are closer together, so the cumulative increase in pH is greater around these granules. This in turn accelerates the rate of volatilisation and more ammonia is lost.

The other two conditions that favour urease activity and hence volatilisation are warmth and air flow over the urea granule. Plant cover acts against volatilisation because it restricts air movement, reduces humidity and enables some of the ammonia gas to be absorbed by low-lying leaf cover. A maize crop that is slow to achieve total ground cover is therefore very susceptible to volatilisation, especially if high rates of urea (> 200 kg/ha) are surface-applied at planting or early in crop development.

In situations where volatilisation losses will have economic consequences, one strategy is to use SustaiN Green, a urea that has been coated with Agrotain, a compound that slows the effect of the urease enzyme, thus allowing more time for the urea to diffuse into the soil.

Get the picture?

To help determine the economic benefit of using SustaiN Green, Ballance has developed a calculator that can be used on farm by your rep. The examples below show how the calculator can be used to predict the net financial benefit of using SustaiN Green. These scenarios are based on a dairy farm that is growing maize. They assume an N response efficiency of 10 kg DM/kg N applied, and an average reduction in ammonia volatilisation losses of 50%. The soil is moist at the time of application. Other assumptions are: a feed utilisation of 80%; feed conversion efficiency of 12 kg DM/kg MS; a payout of $7.00/kg MS.

As you can see, the economic benefits of using SustaiN Green vary with the conditions of use. In pasture, there is a significant benefit when no rainfall follows application, and much less benefit when some rainfall occurs. As rate of urea application increases, the relative advantage of using SustaiN Green instead of urea will also typically increase.

If you are going to be applying nitrogen to pasture or crops, talk to your Ballance rep about the potential economic benefit of choosing SustaiN Green this season.

Scenario	Plant cover	Rate of N applied (kg N/ha)*	Number of applications/ year	Total N applied (kg N/ha/year)	Rainfall or irrigation after application	% of urea lost	Net benefit ($/ha)
1	Pasture	40	5	200	10 mm within 24 hours	5	- 4
2	Pasture	40	5	200	<10 mm within 24 hours	15	+ 42
3	Pasture	40	5	200	None within 48 hours	30	+ 112

Table 1: The potential economic return from using SustaiN Green instead of urea in three different pastoral situations. Where application conditions are ideal (scenario 1), little urea nitrogen is likely to be lost through volatilisation, so there is no cost benefit from using SustaiN Green. In situations where application conditions are less than idea (scenarios 2 and 3), there will be positive economic advantages in choosing SustaiN Green over urea.

*A 40 kg N/ha application equals 87 kg SustaiN Green/ha

Fill in the gaps

You can't manage what you don't measure, but sometimes it's hard to get the information you need and other times it's hard to make sense of all the data you have collected. Whatever your problem, Ag-Hub farm management software can make all the difference . . .

There are so many factors that influence the success of a farm that keeping on top of all of them can be near impossible. Soil moisture, soil temperature, pasture growth rates, feed availability, soil nutrient levels, effluent management – just a few of the things that need attention in between milking, farm maintenance and balancing the accounts, not to mention managing staff. The more of this you can automate – reliably – the easier your life will be.

The latest advances in digital information capture and manipulation can make all the difference to the way you manage your farm, saving you time and money. Ag-Hub online farm management software is one such tool that is being increasingly adopted by leading-edge farmers throughout the country. Ag-Hub offers a range of benefits, and the more intensive your farm, the more value you are likely to get from using Ag-Hub.

One of the real benefits of Ag-Hub is that farmers can pick and choose modules that most benefit them – there is no need to purchase a whole suite of services that you are never going to use. You can start off with a basic package, and then add modules as required. These modules include feed planning, water management, weather monitoring measurement, effluent management, soil moisture and temperature measurement, pasture cover measurement and yield mapping. The beauty of Ag-Hub is that all the data from these systems is held in the one place, so analysis becomes a whole lot easier.

One person who has had a lot of practical experience with Ag-Hub is farm consultant Dr Debbie Care, of AgVice Ltd. As well as consulting, Debbie also works as the educator at the Agritec Centre (Wintec), where she has significant involvement with Tokanui Dairy Research Farm. At Tokanui, Ag-Hub is used to help boost productivity and reduce the farm's environmental footprint.

'One way to use Ah-Hub is to develop strengths in your farm management team in a hands-off fashion. For instance, if you know that you - or your team - are not good at pasture management, then getting this module makes sense. You will still need to take time to measure the inputs, but Ag-Hub quickly shows you the results in an appealing and interactive way. With very little effort, you can improve your ability to manage your farm, because if you measure data, you can monitor what is going on and improve things - productivity and profitability gains will inevitably follow.'

Automated information capture systems that can be integrated with Ag-Hub are a real bonus.

'By capturing data automatically, you can take a proactive approach,' said Debbie. 'For instance, you can look at maps of your nutrient loading on effluent paddocks and see where you need to stop spreading effluent before you risk breaching environmental regulations – that can keep you out of court. Monitoring and improving the evenness of effluent application will also improve nutrient utilisation, enabling the farm to grow more pasture.

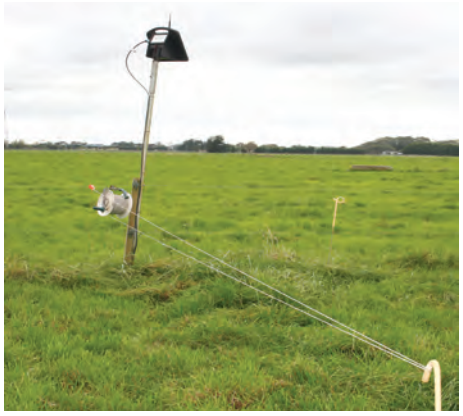
'And if you have soil moisture and temperature monitors installed, you can see a drought coming well before there's any evidence in your pasture or crop. That would mean you'd be able to buy in extra feed before demand shot up, and took prices with it.'

There are some other, less obvious benefits of using Ag-Hub, too, notes Debbie.

'By monitoring your soil nutrient levels you can clearly see where you have potassium issues, so you can avoid these areas for calving. Or even better, you can manage your farm so that potassium excess ceases to be an issue, which would free you up to calve anywhere on farm.

'Not only that, it helps your staff to farm better, because it provides them – and you – with immediate feedback on the consequences of actions, especially when it comes to effluent management. Most people want to get it right, and Ag-Hub helps them achieve that.'

If you are interested in learning more about Ag-Hub, to see if one or more of its modules will benefit your farming operation, contact your local Ballance technical sales representative.



On-farm monitoring equipment simplifies data collection for the Ag-Hub farm management software system

Save a bag and save money too

Multi-trip bags are a great way for farmers to save money – the fact that we can reuse them means we can eliminate unnecessary costs from the price we have to charge for fertiliser products.

However, this only works if we are actually able to reuse the bags when they come back. Fortunately, the majority of our customers return bags in good condition, but there are still far too many bags coming back in an unacceptable state.

As a reminder, we will not accept or credit bags that cannot be safely reused. This includes bags with torn handles (these are a safety hazard), holes in the bag (product will escape), and dirty bags (a health hazard and a source of contamination).

Multi-trip bags that are returned in good condition will be credited to your account, so to avoid disappointment, please ensure that you take care of these bags while they are in your possession.

Outsmarting nature?

Nature doesn't always play fair with farmers. Drought and floods are obvious examples, but natural processes also drive unseen nutrient losses that threaten farm sustainability and profitability.

Article supplied by Jim Risk, Ballance technical consultant

No matter where you farm in New Zealand you are likely to face concerns about environmental issues, particularly in relation to water quality. Whether it is because of groundwater nitrate levels in Southland or Waikato, or surface water quality in Lake Taupo or the Manawatu, increasingly farmers are being asked to consider the environmental effects their business.

Typically of concern are losses of nitrogen (N) and phosphorus (P). These are both important elements for plant growth, so it makes good economic sense to minimise their loss and retain them in the root zone, where they can be used to full value.

In order to address such effects it is important to have some knowledge of the flow paths nutrients travel to reach water bodies. This will almost inevitably vary with soil type. In general, well-drained soils are connected to groundwater, because there is no or little impediment to drainage below the root zone. On the other hand, poorly drained soils are typically connected to surface water; the connection is either by mole and pipe drainage, or via the close proximity of the water table. Of course, there are a wide range of other factors that affect how well nutrients are retained in soil - anion retention, slope, carbon content, water-holding capacity, particle size and rainfall, to name just a few.

Critical source areas

Often a relatively large proportion of nutrient losses will come from a small area of the farm. These regions are known as critical source areas. An example of this might be an area with a high source of P (e.g. high Olsen P or large manure inputs) that is readily connected to a water body so that it is easy for those nutrients to enter the waterway. By identifying these critical sources areas and managing them effectively, losses may be successfully reduced. So, these areas are a good place to start reducing nutrient losses on farm, because small changes can result in large gains.

Loss management tools

Even if critical source areas have been addressed, the issue of general farm diffuse losses will still remain, and this can be more difficult to resolve. However, smart nutrient management can be an effective ally in this war.

Two tools that can help in this battle are the Overseer nutrient budget program and nutrient management plans (NMP). Correctly developed and implemented, these budgets and plans can have both an environmental and economic benefit for your farm.

A nutrient budget provides a number of checks that allows a farming operation to assess its performance, identify issues and improve nutrient use efficiency. In particular, by paying attention to N and P loss indices, N use efficiency and, for dairy farmers, nutrient value to the farm, as measured in cost of fertiliser per kg MS produced, you will get a picture of the efficiency with which nutrients are being used on your farm.

To be even more proactive about nutrient management, we recommend that you develop a farm nutrient management plan. Your Ballance technical sales representative can assist with this, and our updated NMP template will help deliver a robust and detailed plan. Once your NMP has been developed, you will be in a position to plan for future nutrient management strategies, to address agronomic and environmental aspects of farm performance.

Without such a plan it is difficult to systematically address the nutrient needs of your farming operation while simultaneously considering environmental requirements and pressures. An NMP should be seen as a living document that is integral to the farm operation and should be reviewed and updated regularly.

As a simple example of how a nutrient budget could help save money, consider a 230-hectare, 700-cow dairy farm producing 1050 kg MS/ha on Pallic soils. In today's world, an Olsen P of 60 would not be uncommon on a farm of this type. Maintaining this would require an application of 33 kg P/ha – and that's assuming the farm is also getting 3 kg P/ha from P being released from the soil, plus 7 kg P/ha coming in from supplements being brought onto the farm. On this farm, P loss would be about 1 kg/ha, which would be regarded as high in sensitive catchments, medium in other areas.

If the Olsen P is scaled back to 30, within the economic optimum range for a dairy farm on sedimentary soil, only 24 kg P/ha is required for maintenance. At $3.33/kg P, this equates to a saving of $29.70/ha – over $6,800 if it were applicable to the entire farm. Furthermore, the P loss index would decrease to a 'low' rating, so the environment would benefit as well.

Farms can have several critical source areas that contribute a large proportion of nutrient loss. Examples include areas of erosion; fencelines and other areas that promote stock camps; and high Olsen P soils, especially those readily connected to waterways.

Mythbusters part 1

Article supplied by Aaron Stafford, Science extension manager

Confused about the relative merits of liquid versus solid fertilisers? Fertigation offers real opportunities and advantages, but it's not a universal panacea for all that ails your farm.

As the range of liquid fertilisers increases and the use of fertigation becomes more common, the number of myths and rumours about its effectiveness also multiply. While some of these ideas can be disproved through logical argument, the only way to truly test the others is to conduct a series of carefully controlled scientific experiments. In this article, I will examine two claims that are often heard in the field, and which we have tested experimentally.

The two claims under discussion here are related, so it's worth looking at them together.

- **Claim 1** – A 'little and often' approach to nitrogen application is more efficient
- **Claim 2** – Liquid fertiliser nitrogen is more effective than granular.

The reality

It is true that the rate of nutrient input influences plant response efficiency. However, we have to distinguish between total increases in production, and the amount of increase in production per kg nutrient applied. As the rate of fertiliser applied increases, total production increases but the plant response per kg of nutrient applied generally decreases (see Figures 1 and 2).

However, this needs to be kept in perspective. In pasture systems, dry matter response efficiency (kg DM grown/kg N applied) is roughly linear until you apply in excess of 50 kg N/ha. Given that typical application rates for pasture are 30-50 kg N/ha, then a 'little and often' approach is not likely to make much difference in total yield – five applications at 10 kg N/ha should grow the same amount of dry matter as a single application of 50 kg N/ha, because the response efficiency is the same for these two situations.

The experiment

Ballance recently tested this theory using granular **n-rich urea** and **n-rich liquid urea**. Both fertilisers were applied at a rate of 40 kg N/ha. Two scenarios were tested: a single application of 40 kg N/ha and 10 applications of 4 kg N/ha (the 'little and often' approach). Three harvests were taken – one 20 days after the first application of N, the second at 40 days, and the third at 60 days after the start of the experiment. The 20-day harvest was used to mimic a short grazing rotation; the 60-day timeframe allowed for a full pasture response to the applied nitrogen, regardless of application strategy.

The results (Figure 3) show that there was no significant difference between any of the treatments, in terms of total dry matter production. Solid versus liquid, single application versus multiple applications – all grew the same amount of grass.

We did see a difference in the pattern of pasture response between the single and multiple applications, though. With the single application, more of the pasture response occurred by the first harvest, whereas for the multiple applications, the pasture response was more evenly distributed over both harvests.

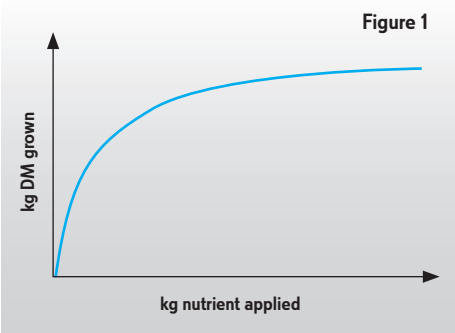
The verdict

Although there is a strong belief that liquid fertiliser is more efficient than granular, and that a 'little and often' approach is superior to a single application, in the situation normally found in pastoral settings, neither of these claims can be substantiated.

However, the frequency of application does have an effect on the pattern of growth response, with a single application generating a flush of growth that gradually tails off, and multiple smaller applications resulting in more steady growth. The total yield is not affected by the frequency of application, though, providing the total amount of N applied is the same in both settings.

This information is useful for farmers. If you want to use nitrogen to build feed coming out of winter, then a single application will likely be the easiest approach. Fertigation is ideal for strategic use of nitrogen fertiliser, provided that the system design supports this.

However, these principles only apply when fertiliser application follows best practice. A single application of nitrogen just prior to heavy rainfall would likely lead to losses through leaching, which would reduce N response efficiency. In this case, a 'little and often' approach could improve plant N response, by allowing better N management and reducing the impact of unpredicted rainfall.



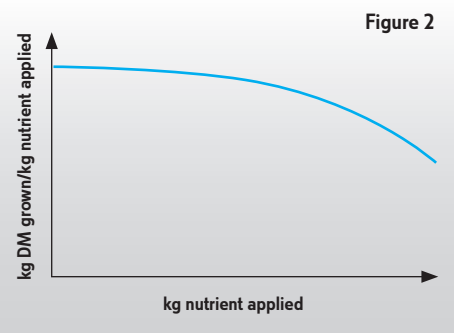


Figure 1: As the amount of nutrient applied increases, there is an increasingly smaller gain in the amount of dry matter grown in response. This is the basis of an 'economic optimum' soil fertility.

Figure 2: Response efficiency decreases as the amount of nutrient applied increases.

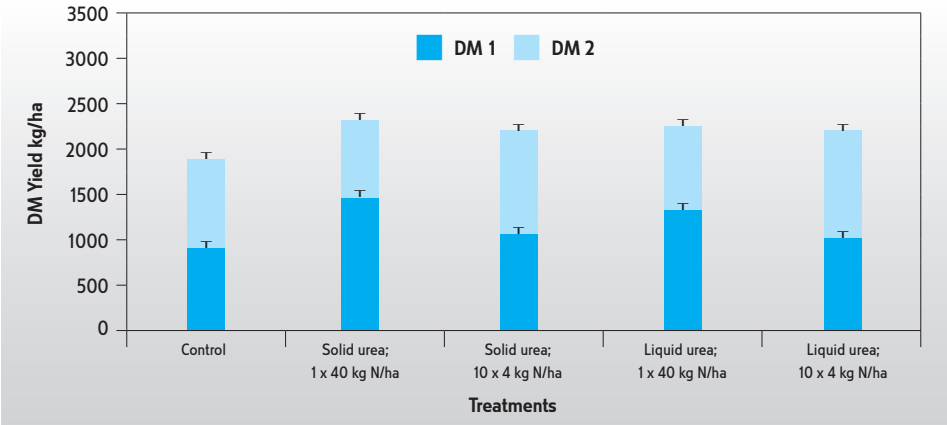


Figure 3: Effect of nitrogen fertiliser form (solid versus liquid) and application frequency (single versus ten) on pasture growth. All treatments had a total of 40 kg N/ha applied.

Planning for success

When Phil and Deb Mikkelsen took over the family farm five years ago their primary aim was to make it profitable. And by applying lessons from their corporate years, they are well on the way to their goal.

Phil acknowledges that he and Deb are profit driven: 'Although this is a family farm, there is no point in doing it purely for the love of it - you would go broke. We have tried to find farming policies that will maximise what the farm can deliver. We make sure what we spend is beneficial to the farm, and focus on finding the most effective ways of doing various farming operations to maximise our budget.'

The Mikkelsens farm just to the northwest of Taihape, on a 315 ha property made up of summer-safe medium hill country (60% moderately steep, 30% rolling and 10% flat/easy). They run 1600 ewes, 500 hogget replacements, 200 Angus breeding cows and 20-30 heifer replacements. They produce calves for the autumn weaner market and all lambs are finished (they generally produce around 2500 lambs, with a 130-140% lambing percentage). They carry out hogget mating and cows calve as two year olds, so a lot of emphasis is placed on growing young stock well. In fact, looking after their stock is one of their primary drivers: 'We try to ensure stock are in the best possible condition and we get the highest quality breeding stock - after all, the animals are what make you money.'

Thanks to their previous careers, Phil and Deb have brought a different perspective to running their business (Phil was a systems manager for Fonterra and Deb an economist at Treasury and then Telecom). They have a strong focus on analysis and forecasting, and are always looking to learn more to help them make the best of their property. Both are studying for diplomas in Rural Studies at Massey University, Phil concentrating on operations and animal production papers and Deb on financial management.

This drive to learn was one factor in their decision to conduct a Whole Farm Plan with Horizons Regional Council. The Mikkelsens' intentions were to learn about the farm's soil types and its land use capabilities. Whole Farm Plans look at a farm's resources, including soil, vegetation, land and water, and analyse how they can be used to achieve the best production from the farm and meet its business goals, in a way that is sustainable.

Once they had completed their Whole Farm Plan, the Mikkelsens were in a better position to examine where and how to use fertiliser to its best advantage, rather than just applying a blanket cover of the one blend.

'Gone are the days when you just send a plane over the farm,' says Phil. 'Instead, you have to knuckle down and look at how to maximise your fertiliser program. Every time I put in a crop or grass, I try to find out what is the best fertiliser to put on those particular paddocks without breaking the bank.

'I could do the research myself, but I would rather pick up the phone and talk to Janelle [Gillum, the Ballance Technical Sales Representative in Phil's district]; she's really approachable. After all, Ballance is there to try to help us improve our business, not just to sell fertiliser. In fact, if I ring up and say I want some DAP, Janelle will ask me why.'

Janelle thinks Phil's proactive approach sets him apart. 'He plans a year in advance, which a lot of sheep and beef farmers don't like to do because they are not too sure about the money they are going to get for their lambs. Phil and Deb are keen to use fertiliser every year, they realise it is really important to keep their pastures going.'

Phil's fertiliser applications are tailored to each individual paddock. Each year he develops 10-15 ha, carrying out a thorough investigation into each paddock, including soil and herbage testing, before applying a tailored fertiliser blend. Afterwards, he goes back and retests to ensure he has got it right.

'A lot of guys put in new grass and forget about it, then they wonder why it fades away after five years. They spend a fortune to do it and it's not the grass, it's what they do. New grass needs to be treated with respect,' says Phil.

Phil and Deb see a bright future for their farm. 'We thought this property had a lot of potential. We just wanted a new challenge, to work for ourselves and have something to get our teeth into. I always wanted to try farming and didn't want to die wondering. We are rolling up our sleeves to make a go of it.'

Phil and Deb Mikkelsen, with baby Anders

JO HONEY

Approach your maintenance fertiliser programme strategically - prioritise high-value areas of the farm, such as those used for crops, finishing and new grass

JAMES PARSONS

If you raise your production goals, your fertiliser needs are likely to change - make sure you get specialised advice and a customised fertiliser recommendation

MARK REDSHAW

Don't miss out on your maintenance or capital fertiliser this season - order your products and book spreaders or top-dressing planes early so that you get in before the rush

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