

Grow

lower south island



**KNOW YOUR
NITROGEN
NEEDS**
P2



**OUTSMARTING
NATURE?**
P5



**BEAT THE
RUSH**
P7

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

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.

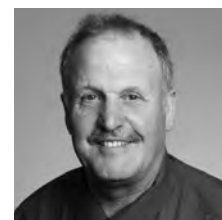
Calculating the odds

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




Article supplied by Jeff Morton, Ballance technical consultant



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)
	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
	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
	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?

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).

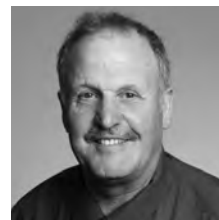
If the soil is so dry that urea granules can't dissolve into it, then there will be no ammonia volatilisation loss. Once sufficient rain (or irrigation) occurs, the urea will dissolve and enter the soil. If there's insufficient rain, volatilisation losses will still be an issue.

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

Article supplied by Jeff Morton, Ballance technical consultant



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 ideal (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 Ag-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



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

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.

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.

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



Article supplied by Jim Risk, Ballance technical consultant



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; fence lines and other areas that promote stock camps; and high Olsen P soils, especially those readily connected to waterways.

Mythbusters part 1

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

Article supplied by Aaron Stafford, Science extension manager



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.

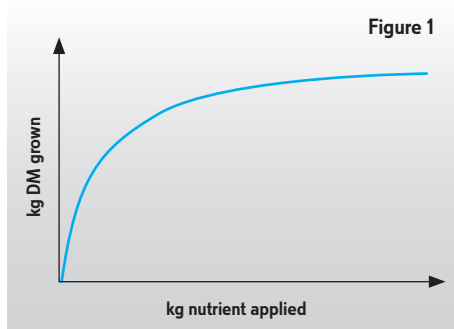


Figure 1: As the amount of nutrient applied increases, there is an increasingly smaller gain in the amount of dry matter grown in response. This is the basis of an 'economic optimum' soil fertility.

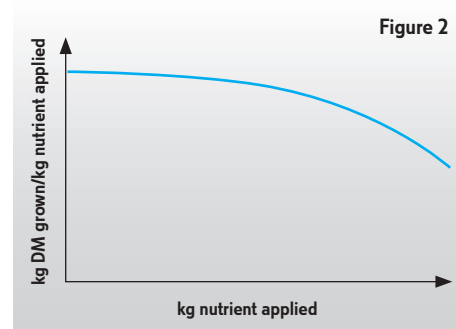


Figure 2: Response efficiency decreases as the amount of nutrient applied increases.

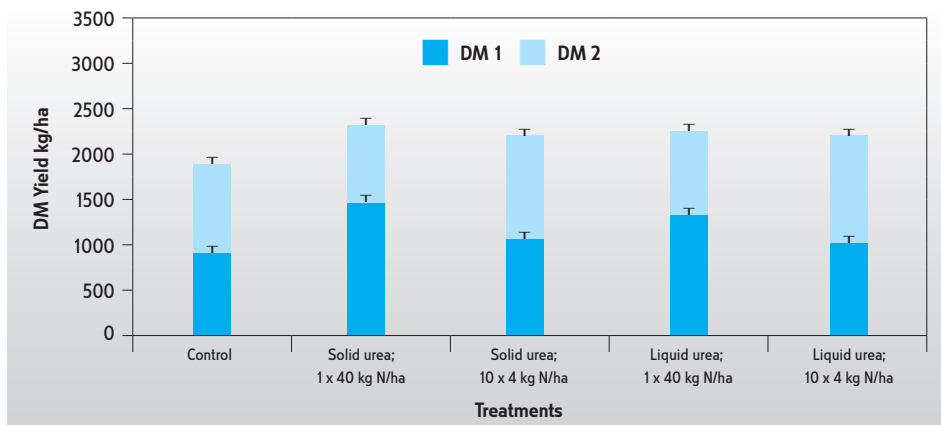


Figure 3: Effect of nitrogen fertiliser form (solid versus liquid) and application frequency (single versus ten) on pasture growth. All treatments had a total of 40 kg N/ha applied.

Beat the rush

The key to taking advantage of good prices for sheep and beef lies in growing enough feed – and that means addressing fertiliser needs on your hill country.

At long last it looks like sheep and beef farmers are going to be in a position to reinvest in their farm and build their business, thanks to at least two consecutive profitable years. For many, one area of attention will no doubt be restoring soil fertility levels on hill country, so that they can build stocking rates and boost income.

In fact, within the fertiliser industry, we are already seeing evidence of this intention. Indications from our customers point towards a large increase in the amount of fertiliser and lime due to be applied to hills this season.

However, there is a catch! The downturn experienced by sheep and beef between 2007 and 2010 meant services such as aerial top-dressing had to reduce their capacity in response. Now that the demand is back, there are limited planes and trucks to service the need. The only way to deal with this will be to get in first – order your fertiliser and book your aerial spread before the rush starts.

Of course, before you do this, you'll want to answer some critical questions . . .

If money is limited, what should I apply to my hills - fertiliser or lime?

The answer to this will vary from farm to farm. But if you have a low Olsen P (<15) and low soil pH (<5.5) then fertiliser should be your priority. Research shows there is more financial gain to be made from applying fertiliser in this situation. Where Olsen P is high (>20) and pH low (<5.5), lime should be your priority.

What nutrients should be applied in the fertiliser?

Sixty years of research in hill country shows that the two most important nutrients in this situation are phosphorus (P) and sulphur (S). These are most cheaply applied in **superten**-type products. The other essential macro-nutrients - calcium, magnesium and potassium - are either supplied from soil minerals or applied in lime and **superten**. As far as trace elements are concerned, the only one that might be required for pasture growth is molybdenum. Check levels by taking a clover-only herbage sample. There will undoubtedly be more than enough copper, zinc, iron and manganese present in the soil to meet plant needs.

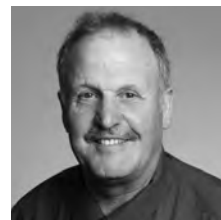
How important is timing of application?

If there has been a good fertiliser history and soil Olsen P levels are greater than 15, then the timing of your annual fertiliser application does not matter because there is adequate P in the soil to supply pasture. But if Olsen P levels are too low to provide sufficient P for pasture growth, then it's important to get fertiliser on as early in the season as possible. This will help boost clover and improve pasture production. This scenario is likely to be the case on your steeper hill country. So if you can't afford to apply all your P and S fertiliser early in the season, consider applying it to your steep hills in late spring or even early summer, and dealing with the easy hills and flat land in autumn, when more cash is available.

What place has nitrogen fertiliser got on my hills?

Of all the nutrients, it is nitrogen (N) that drives pasture production. If there is insufficient

Article supplied by Jeff Morton, Ballance technical consultant



atmospheric N being fixed by legumes, the pasture will be dominated by poor grass species such as browntop. These grasses are only in a green vegetative state for a short period in the spring, suppressing feed supply as well as quality.

The ideal time to get N on in hill country is early spring, so you can increase pasture cover for lactating ewes. As for all inputs, N will only give a profitable return if the extra pasture is converted into high-value meat and wool products. The economics of N application depend on the returns achieved from your products and the cost of both the nitrogen product and application services.

To sum up, as with all aspects of farming, forward planning is paramount. Aim to get as much fertiliser as possible on the areas that will give the best response and apply this as early as possible in the growth season. A good soil testing programme will allow you to determine where nutrients need to be applied, and at what rate.



All indications are that there will be a large increase in the amount of fertiliser and lime applied to hill country this season

GARY KIRKMAN



Pasture and crop responses to nitrogen will be lower if volatilisation losses are high - consider using Sustain Green to counteract this effect

RICHARD PRESTON



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

lower south island



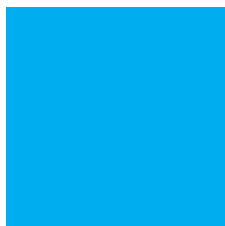
AREA SALES MANAGER
STEPHEN BELTON
BAgrSc
027 495 6347



KEY ACCOUNTS
RICHARD PRESTON
BAg(Com)
027 493 7277



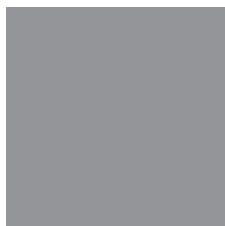
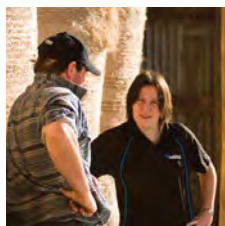
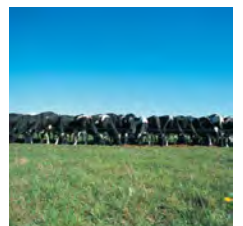
KEY ACCOUNTS
JESSICA RUDDENKLAU
BSc
GradDipApplSc
027



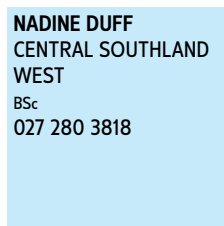
REGION 1
SIMON MCLEAN
NORTHERN
SOUTHLAND
BComAg
027 433 8420



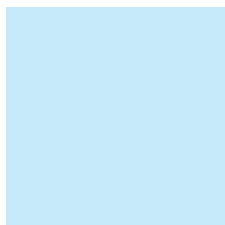
REGION 2
GARY KIRKMAN
TE ANAU / WESTERN
SOUTHLAND
SNM
027 433 8416



REGION 3
NADINE DUFF
CENTRAL SOUTHLAND
WEST
BSc
027 280 3818



REGION 4
GRANT HARDIE
CENTRAL SOUTHLAND
EAST
BComAg
027 494 8895



REGION 5
LATOYA GRANT
WEST OTAGO
BAgSc (Hons)
027 434 4423



REGION 6
CHRIS PATERSON
SOUTHERN
SOUTHLAND
BAgSc(Hons)
027 434 5972



REGION 7
NADINE RESTIEAUX
SOUTH OTAGO /
SOUTHERN
SOUTHLAND
BAg
027 433 2533

