



Consultants' Newsletter – Autumn 2007

Welcome to the autumn 2007 issue of the Ballance Agri-Nutrients newsletter for consultants. Since the last newsletter the team at Ballance has grown considerably, reflecting the increased need for information and service in the marketplace.

We now have four people on board our agro-sciences team. Still led by Warwick Catto, the team also features Aaron Stafford, who is based at Mount Maunganui; pasture specialist Murray Lane (previously with Wrightson), who is based in the Waikato; and in the South Island, Jeff Morton, previously with AgResearch. This team provides the practical interface between Ballance's science and the wider farming community. It is backed up by other in-house personnel, three of whom have science PhDs.

In recent times, much of Ballance's R&D budget has been channelled into projects aimed at reducing unwanted environmental impacts of plant nutrients applied as fertiliser. One aspect of this that has been much in the news recently is the use of nitrification inhibitors to reduce nitrate leaching. In this newsletter, we present some of the research results behind our second-generation nitrification inhibitor, DCn.

Ballance has also added three new products to its list in recent times. These are the pasturezeal G2 range of products, Ballance Hatuma Dicalcic and Ballance BioPhos. The key characteristics of these products are also presented in this newsletter.

In addition, this newsletter contains a practical and helpful checklist of some of the important seasonal concerns regarding nutrient management and animal nutrition.

If you have received a printed copy of this newsletter and would like to receive it electronically in the future, please email your contact details to reception@ballance.co.nz, writing 'consultants' newsletter' in the subject line. If you no longer wish to receive this newsletter, please advise us by emailing reception@ballance.co.nz.

Kind regards

The Agro-Sciences Team
Ballance Agri-Nutrients



Nitrification inhibitors

Many of you will have been at forums where nitrification inhibitors have been discussed. These are chemicals that, when applied to pasture during autumn and late winter, reduce nitrate leaching (by 20-60%) and nitrous oxide emissions (by 50-70%). Associated with these reductions are pasture yield responses (1-9%), mainly in early spring.

Last year, we introduced DCn, our second-generation nitrification inhibitor. It will be officially launched this autumn. The active ingredient in DCn is dicyandiamide (DCD), which is added to zeolite to produce an easy to spread, granular product.

To support this new product, we have funded a large research programme over the last four years, mainly with AgResearch. Investigations have focused on evaluating the formulation efficacy, the impact of timing of applications, and the economics of using nitrification inhibitors. The three formulations studied are: granular (DCn); liquid (dissolved DCD); and suspension.

Figures 1 and 2 show that DCD effectively inhibits nitrate leaching, regardless of whether it is applied in a granular form (as DCn) or in a liquid form. The degree by which leaching is reduced varies with both soil type and the time of application of the DCD. Similar results were seen at other trial sites.

Rotorua 2005

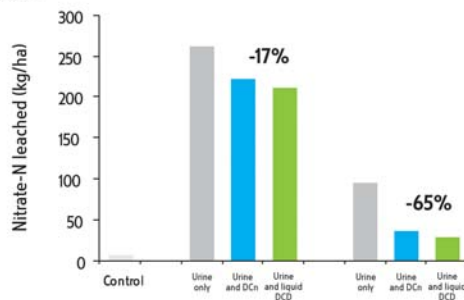


Figure 1: The effect of DCD formulation on reduction of nitrate leaching at a Rotorua trial site.

Ruakura 2005

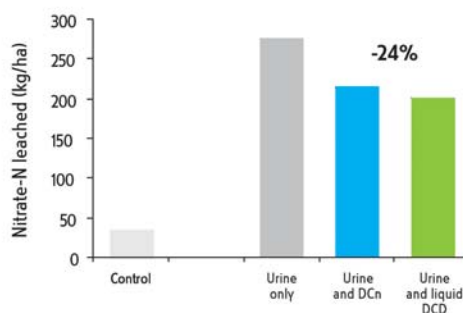


Figure 2: The effect of DCD formulation on reduction of nitrate leaching at a Ruakura trial site.

Whether DCD is applied as a solid or a liquid, it is important that it goes on prior to the start of the main drainage season. This is illustrated in Figure 3. Applying DCn in April resulted in an 18% reduction in nitrate leaching. Although a greater percentage decrease in nitrate leaching was achieved with a later application of DCn, the absolute levels of nitrate leached in the absence of DCn were lower, because some drainage had already occurred in autumn.

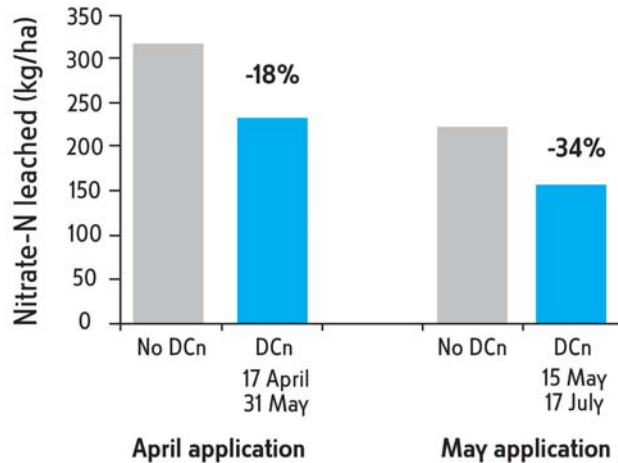


Figure 3: The effect of timing of DCn application on reduction of nitrate leaching.

Early in the season grass is still growing and nitrate is removed from the soil by plants, but as the temperatures cool nitrate starts to accumulate in the soil. DCD needs to be applied once this nitrate has built up, but before the first drainage event leaches it away. The best time to apply DCD varies according to local climate and weather patterns.

Figures 4 and 5 show the pasture yield that can be obtained on urine patches alone, by applying DCD in various formulations. Note that timing of the application and the type of soil involved are much more important in determining yield increases than the formulation of the DCD.

Rotorua 2005

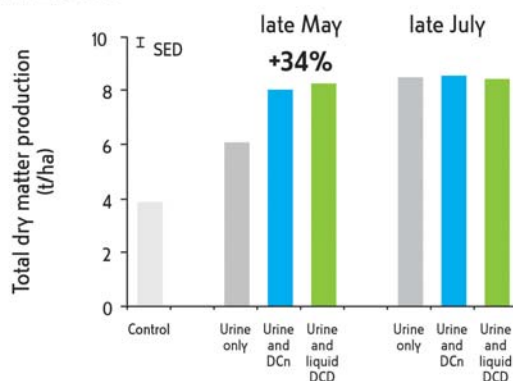


Figure 4: The effect of DCD formulation on dry matter production from a urine patch at a trial site at Rotorua. The late July application showed no response because of the very dry spring.

Ruakura 2005

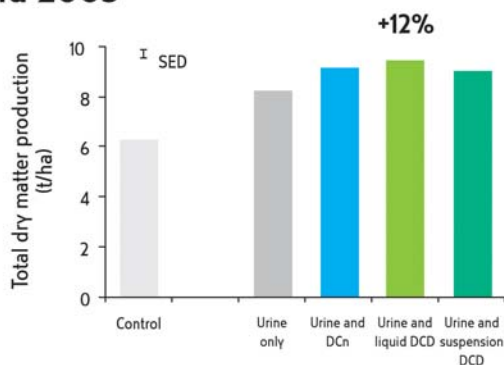


Figure 5: The effect of DCD formulation on dry matter production at a trial site at Ruakura.

Significant pasture yield increases on urine patches alone can be achieved, but these must be translated into whole-paddock equivalents in order to be meaningful. When this is done, the typical pasture yield responses range between 1% and 9%. For a dairy farm, a 5% increase in pasture production will cover the cost of two DCn applications; the reduction in nitrate leaching and nitrous oxide emission is an extra benefit. This benefit could be converted into dollars if a future nitrogen-capping scenario (e.g. Lake Taupo) or incentive for reducing nitrous oxide (e.g. proposed government options) was implemented.



Pasturezeal G2

One of the challenges facing the fertiliser industry is the production of a stable, affordable product that combines both nitrogen and phosphate in the levels needed on many pastoral farms. Combining urea with single superphosphates is not an ideal solution, because these two products are chemically incompatible – the urea absorbs moisture from the air, and reacts with the super to form a sticky mass that can clog spinners and cause striping. We have recently stopped despatching urea and superphosphate blends for this very reason.

Ballance has found a way to overcome this problem, using its patented coated urea technology. This allows nitrogen and phosphate to be blended together in a range of ratios and in combination with other nutrients, to give a series of products with excellent stability and a high degree of effectiveness.

Aerial spreading tests have shown that there is no segregation of the nitrogen and phosphate components of pasturezeal G2 blends, when applied at 400 kg/ha. Similar results were obtained for groundspread tests, where the distribution of the nitrogen component spread alone was similar to the distribution found when the nitrogen component was spread as part of a blend.

The stability of the pasturezeal G2 range of products means they can be stored for up to two weeks on farm, making it easier to time fertiliser applications.



Ballance Hatuma Dicalcic

Ballance has recently added a dicalcic fertiliser to its list of products. This is the outcome of a business arrangement with Hatuma Lime, based near Waipukurau.

Ballance Hatuma Dicalcic is made by blending equal amounts of wet lime with fully cured superten, and leaving this mix to mature for a period of four weeks. During this time the water-soluble monocalcium phosphate in superten reverts to citric acid-soluble dicalcium phosphate. The porous nature of Hatuma lime and the addition of water to the process means that there is virtually no water-soluble phosphate left at the end of the process.

The product has a neutral pH (7.1), 4.7% phosphorus, 5.3% sulphur and good liming value, each tonne of the product being equivalent to 420 kg of pure lime.

The high proportion of dicalcium phosphate in Ballance Hatuma Dicalcic makes it ideal for use in situations where phosphate run-off is a risk.



Ballance BioPhos

The soil microbial community is responsible for the biological reactions that result in the release of nutrients from organic matter, making them available for plant uptake. Products of microbial metabolism such as organic acids can also promote the release of inorganic forms of plant nutrients.

Around the world, scientists have been exploring the use of micro-organisms to increase the availability of plant nutrients for decades, and in recent years work has included investigations into the use of bacteria and fungi to release phosphate directly from rock, especially low-grade rock that is not suitable for turning into superphosphate.

One product that exploits this principle is BioPhos, a composted phosphate fertiliser that uses specific fungi to improve the availability of the phosphate.

BioPhos has been sold in New Zealand for some time, and Ballance officially took over the domestic rights to this product last year. BioPhos contains 13.5% phosphorus, 30% calcium, 5% organic matter and a neutral pH.



Seasonal review

In each of our autumn and spring newsletters, we thought that it might be useful to list some of the important seasonal events associated with nutrient management and animal mineral nutrition.

Fertiliser issues		
	Dairy farms	Has a nutrient budget been conducted?
		In light of the nutrient budget, has the fertiliser recommendation for specific areas been adjusted to reflect needs, e.g. no K on effluent areas?
		Has all of this year's maintenance fertiliser been applied?
		When is the late autumn/winter soil test due?
		Is there a looming feed deficit that can be overcome by the use of strategic N?
	Drystock farms	Do lower returns mean only some areas of the farm will receive autumn fertiliser? If yes, prioritisation is important. Key concerns should be crops, new pastures and stock finishing areas.
		Are hill pastures low in legumes? If yes, only apply low rates of P (<10 kg P/ha); applying more will not bring an economic benefit as N will be limiting production
		Will winter crops benefit from a strategic application of N? Note that this will partly depend on soil moisture availability.
Mineral nutrition		
	Cobalt	Analyse the results of liver samples to assess whether the cobalt/vitamin B ₁₂ treatment method being used for lambs is effective.
	Copper	If cattle and deer have low levels of copper, seek advice from a vet. If needed, apply a capital dressing of granular copper

		<p>sulphate at 12 kg/ha (if molybdenum levels are < 1 ppm) or liquid copper sulphate at 3 kg/ha (if molybdenum levels are > 1 ppm).</p>
Lime		
	pH	<p>Has any scheduled lime application been completed? Once soil pH drops below 5.2, legume growth declines, and this is soon followed by a reduction in carrying capacity</p>
	Aluminium	<p>Is the soil exchangeable aluminium greater than 3 ppm? At this level, aluminium will restrict clover root growth. Raising the soil pH to 5.5 or greater will help to overcome this.</p>