

Good nitrogen management

Healthy plants, healthy cattle and reduced emissions

Did you know? Efficient farm practices that improve productivity and profitability also reduce greenhouse gas emissions.

Whether or not you believe the climate is changing and whatever you believe the causes may be, the fact is that profitable dairying and reduced emissions go hand in hand.

DairySA's Farm-Link project, part of Dairy Australia's national Profitable Dairying initiative, is demonstrating how dairy farm businesses can improve efficiency and profitability while also reducing greenhouse gas (GHG) emissions.

The key Profitable Dairying messages are:

- > Identify and cull less productive animals. Your most productive cows make the most money and produce the least GHG emissions.
- > High quality feed is always best. Feed a high quality diet to increase milk production and reduce GHG emissions.
- > Get your nitrogen fertiliser strategy right. Apply nitrogen at the right time, in the right place, with the right product and at the right rate to improve on farm nitrogen use efficiency and reduce GHG emissions.
- > In calf, on time, every time. This makes your herd more profitable and reduces GHG emissions intensity.
- > Keep cows comfortable. During extreme weather events this will reduce stress and associated losses in milk production.
- > Smarter energy use. Monitor electricity consumption and equipment performance.

Four Farm-Link farms across SA are demonstrating practical use and adoption of industry programs such as DairySAT and Fert\$mart, among others, which aim to improve productivity and profitability. The farms are located in different dairying regions of the state and they operate varying systems ranging from TMR to virtually entirely pasture-based.

Perrin and Kelly Hicks Misty Downs, Mount Compass

Farm Facts (2014/15):

- > 148 hectares milking area
- > Predominantly Friesian with some Jersey
- > Total herd 160 cows
- > 2014/15 milk production 1.25 million litres



Perrin Hicks and Warren Jacobs, his business partner.



Misty Downs, Mount Compass

Emissions and their sources have been calculated for each farm using the DGAS tool and business analysis of all four farms has also been completed to identify the best areas for each business to focus on for improved profitability and reduced greenhouse gas emissions.

Perrin Hicks is an active member of DairySA's Mount Jagged Dairy Discussion Group, which has been examining nitrogen application practices to help maximise winter pasture growth and reduce animal health issues.

Nitrogen should be used strategically – when plants will respond to extra nutrition and when extra feed is required.

As per the Profitable Dairying key messages, it then comes down to the 4R's: using the right source of nitrogen at the right rate, in the right place and at the right time. This will minimise wastage, maximising fertiliser efficiency and reducing greenhouse gas emissions.

According to Perrin, the Mount Jagged DDG has observed that pastures generally remain responsive to nitrogen fertiliser during the Fleurieu Peninsula winter, but overall growth rates are slower in the colder months and growth responses to added nitrogen are smaller (around 10 kg DM per kg N as opposed to 20 to 40 kg DM per kg N for spring applications).

"Even so, these smaller winter growth responses are valuable to us because grazing feed is usually tight in winter," says Perrin.

However several Mount Jagged farmers experienced poorer growth responses to added nitrogen in the coldest winter months back in 2013.

"It appears that sulphur was becoming temporarily tied up in cold, wet conditions and limiting the plants' ability to properly utilise the added nitrogen," says DDG Coordinator Greg Mitchell.

"Farmers who applied nitrogen and sulphur fertilisers didn't experience the problem."

Subsequent soil testing on several Mount Jagged farms through DairySA projects also revealed unexpected soil sulphur deficiencies on some of these farms.

Tips for making the most of applied nitrogen

- › Develop dense and healthy winter-active pastures (based on ryegrasses, phalaris, prairie grass and/or cereals) to best respond to winter applications of N.
- › Limit or cease N applications in winter on less winter-active, less responsive pastures (e.g. chicory, tall fescue). N inputs can be re-started on these pasture types (depending on feed requirements) in mid-spring.
- › Ensure pastures to be treated with N already have adequate base soil fertility (i.e. other major nutrients like P, K and S and trace elements are at adequate levels). Treat any strongly acid soils with lime.
- › Adopt block grazing practices to maximise growth of existing pastures and ensure the best growth responses to any applied N.
- › During the growing season, nitrogen use efficiency (i.e. kg extra DM grown per kg N applied) can be maintained at input rates of up to 1 kg N/ha/day on responsive pastures.
- › Apply N to pastures within a few days of being grazed (in rotation) or to establishing pastures which will not be grazed for at least 21 days after applying the N.
- › Defer grazing for at least 21 days after applying N, so pastures can properly assimilate it and grow on unhindered for a full growth response.
- › Do not graze between 5 and 20 days after spreading the N:
 - N is initially taken up and present in the plant as nitrate, which can cause metabolic problems in cows.
 - Cows waste energy to excrete this extra non-protein N as ammonia in their urine, so milk production is reduced and N is lost to the environment.
- › Application rates need to be adjusted according to expected grazing rotation lengths, so only apply enough N for plants to assimilate; any more is wasted. For instance, on a 30-day grazing round, apply around 30 kg N/ha as paddocks are grazed.

For more information, contact:

info@dairysa.com.au or 08 8766 0127

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