

Maximizing N Use in the hill country

Running short of feed and thinking about a strategic application of nitrogen to see you right for the spring? Great idea, but there are some simple guidelines for maximizing the response. And at the same time, any applications need to be responsible without impacting your environment.

To achieve the best response from nitrogen applications consideration needs to be given to soil temperature, soil moisture, soil condition, seasonal influences and the feed demand of the grazing stock. If the soil conditions and moisture levels are favorable you can achieve a 15kg DM/ha response from 1 kg N/ha in a drystock situation. If conditions are wrong the economics may not stack up.

Soil moisture and temperature play an important role in the utilization of applied nitrogen. These influence the processes occurring in the soil that make the N available to the plant. Soil temperatures should be above 7°, and stay there for at least four weeks after application to achieve an economic response. When soil temperatures are low, plant uptake of nitrogen is slow and the risk of loss by leaching is increased.

Soil moisture is needed to aid the uptake of nitrogen in a plant available form - it is available to the plant roots when in soil solution. This also means that it is actively mobile during rain events. When soils are saturated or heavy rain is predicted, N losses through leaching will be high. Any nitrogen that is leached can end up in our waterways. It is critical that applications are applied when there is some soil moisture, but too much can result in losses.

The condition of your soil at application time is just as important as temperature and moisture. It is important that the soil is not excessively wet, or drainage reduced through pugging damage. Having an understanding of the different soil types on your property will give you an indication of which soils have better drainage or warm up quicker, and are likely to have a better response to any nitrogen application.

An optimum response from nitrogen fertiliser will not be achieved during dry periods. This is because plant growth is reduced and hence the ability to take up nitrogen. Nitrogen should not be applied after a dry period until sufficient regrowth has occurred after rain. This will ensure that the applied nitrogen is not lost, the plants are actively growing and able to take up nutrients.

To achieve the best response, you should be feed budgeting to ensure that the dollars spent will be fully utilized. The full response to nitrogen fertiliser is over a six week period, so once you can visibly see a feed shortage, action is too late. Feed budgeting will identify these pinch periods and this combined with any historical data becomes a powerful management tool.

To capture the most benefit from an application, pasture covers should be above 1000 kg DM/ha or 25 mm. Plants are slow to respond to applied fertiliser when height is less than 25 mm due to insufficient plant leaf area for photosynthesis. This extra pasture grown needs to be fully utilized during the period of active growth, and in addition should be grazed by the most profitable stock classes on the property.

Experience suggests that the greatest responses obtained from nitrogen will be in the spring, then the autumn, followed by the winter. This is due to soil moisture and temperature levels. For those hill country farmers who have significant summer dry periods, consider your pasture composition in regard to your fertilizer applications. If your clover plants are not persisting due to dryness, then strategic applications of nitrogen maybe more beneficial than applying phosphate. This is because in the NZ pastoral system, nitrogen is still the most growth limiting nutrient for the pasture plant.

When applying nitrogen in the hill country consider aspect also as the soil moisture and temperature levels will vary between sunny and shady faces.

Consideration also needs to be given to clover conditions. Often on the easier country, farmers are creating a challenging environment for the clover to persist. Higher fertility pasture species are providing more competition and shading, stock are

larger providing more treading pressure and increased soil compaction, combined with increased nitrogen cycling, the clover plant is slowly being out competed. So although the clover root weevil is being blamed for lower clover populations around the countryside, it is worth considering that this is not the only cause.

Single dressing, high application rates should be avoided by applying nitrogen of rates 20-50 kg N/ha. Rates in this range are the most efficient and minimise leaching loss.

On the environmental side, plant available nitrogen that is not being utilized by the plants often ends up in our waterways. Apart from pouring money down the drain, there is persistent increasing pressure from regional councils, Industry groups such as Fonterra, and other organizations such as Fish and Game for farmers to get this right. The use of riparian management, buffer zones, grazing management, stocking policies, nutrient budgeting and management are just good farm management practices that can achieve this.

Like most decisions made on farm, nitrogen use should be implemented wisely. Monitor the soil temperature and moisture, consider the pasture growth curves and budget for the property and the likely response. Identify the production gains that you want to achieve, with the appropriate class of stock. If the decision to apply nitrogen is undertaken using this information, you should achieve the optimum economic response to you nitrogen fertilizer strategy with limited impact on the environment.