Feed Shortage 2018

Maximising spring feed with nitrogen

When hay and grain prices are high, nitrogen can be a relatively cheap way to generate additional feed.

How much does nitrogen grown grass cost?

This will depend on the cost of urea, the response rate and the utilisation (how much of the extra growth is wasted). Table 1 shows, even at below average response rates e.g. 10:1, additional pasture grown compares favourably with current costs for purchased feeds (particularly purchased hay and silage). When purchased feed prices are high, below average response rates will be profitable.

Table 1 Variation in the cost of additional pasture consumed when urea is $600/tonne. Utilisation column assumes this is the utilisation of the extra pasture produced. 100% utilisation of extra pasture produced is achievable.

Extra response kg DM/kg N	Utilisation (%)	Cost $/T DM
High response 20:1	100	65/T DM
	75	87/T DM
Average response 10:1	100	130/T DM
	75	175/T DM
Low response 5:1	100	260/T DM
	75	350/T DM
Very low response 3:1	100	435/T DM
	75	580/T DM

Key messages

- ☑ Nitrogen boosted pasture can be significantly cheaper than imported fodder
- ☑ Even at low responses of 5:1 or 3:1 (refer to Table 1), nitrogen application could be very economical this season
- ☑ Apply N at rates of 20–50 kg N/ha per application, no closer than 21 to 28 days apart when the pasture is actively growing and can utilise the N
- ☑ Ensure soil moisture is adequate to sustain the regrowth and temperatures are conducive to good pasture growth

Pasture conservation

In the case of pasture conservation, it is recommended to apply N at a higher rate (up to 60 kg of N/ha in later spring), after grazing when the pasture is closed up for conservation. Results from using split applications of N, for example after grazing and again partway through regrowth, are more variable, and this practice isn't recommended.

What influences the response rate to nitrogen?

The amount of pasture grown in kg DM/kg N applied is the 'response rate'. For example where 30 kg N/ha is applied and an additional 300 kg DM/ha of pasture is grown, the response rate is 10 kg DM/kg N fertiliser applied. The response rate is dependent on:

- Amount of available N in the soil – the greater the deficit, the higher the response.
- Soil temperature – the warmer the soil, the greater and more immediate the response
- Plant growth – the higher the growth rate potential, the greater and more immediate the response. Also better species composition means better responses.
- Moisture – too much or too little water will lower the response. The best response is from a full profile.
- Rate of N applied per application – there is a diminishing response at high application rates, but also an unreliable response at low rates, therefore stick to rates between 20 and 50 kg N/ha per application depending on the additional growth required.
- The availability of other plant nutrients and soil pH.

General guidelines for N management

- Apply N strategically, rather than by fixed recipe: Before each N application estimate the likely N response (i.e. from look up tables, experience and consultant) and compare the cost of additional pasture produced to other purchased feed options.
- Only apply N when the pasture is actively growing and can utilise the N. Ensure soil moisture is adequate to sustain the regrowth and temperatures are conducive to good pasture growth.
- Apply N at rates of 20–50 kg N/ha per application, no closer than 21 to 28 days apart. It can also be useful to determine the rate by grazing interval multiplied by 1.0 to 1.75 kg N/ha day. Remember as urea is 46% N, 50kg N/ha is approximately 108kg of urea.
- Ensure that the extra pasture grown is utilised either through gazing or as harvested forage, as utilisation has a big impact on the economics of using N.
- To get the most out of your N application on ryegrass, graze as close to 2½ leaves or canopy closure as possible.
- Do not graze perennial pastures for 7 to 14 days after nitrogen application, as this is when nitrate levels are highest. Other forage types and weedy paddocks may need to be left longer.
- Cloudy or overcast days will increase the time needed before paddocks can be grazed after nitrogen application.

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Table 2 Estimated pasture response to N based on existing growth rate

Pasture growth rate	Pasture growth (kg DM/ha/day)	Response (kg DM/ kg N)	Pasture quality	Climate
Slow	10	5–8	Poor/open sward/ high weed content	Cold/moisture limited/ waterlogged
Moderate	20–40	10–15	Ryegrass pasture	Typical late winter/ early spring
Fast	50–70	15–20	Well managed ryegrass pasture	Typical mid spring

Table 3 Nitrogen application – timing and impacts

Too early	2–3 days pre-grazing	1–3 days post-grazing	3–7 days post-grazing
Applying N more than 3 days before grazing can result in pasture taking up N and cows grazing it off before a growth response can be seen. It can also cause serious animal health issues.	Pre-grazing application can be used to reduce ammonia loss in hotter weather.	Best responses occur applying N soon after grazing.	For every day delayed in applying N post-grazing there is about 1% loss of the potential extra growth.

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