

Successfully reducing total N application

A recent trial has explored if it is possible to reduce total nitrogen inputs on grassland by 15% without negatively affecting returns and at the same time positively increasing farm sustainability.

Grassland farmers looking to reduce emissions and improve farm sustainability will be aware that nitrogen fertiliser is a significant contributor and will be wary of reducing its use if yield and forage quality are to be maintained.

Of all the nutrients, nitrogen is still the key driver for yield and protein formation, so when fertiliser costs rose a couple of years ago, many farmers held back on applying other primary, secondary and micronutrients in favour of nitrogen.

Farmers may have navigated a single-year break of these nutrients without too much damage, but prolonged gaps of several years could allow nutrient deficiencies to appear in the soil profile. One option for farmers is to scale back on the total amount of nitrogen applied and use the saving for added nutrients, although many may view this as a risky strategy given nitrogen's importance.

However, a 2023 trial set out to explore just this and examine two fertiliser products side by side, on the same grassland crop, to assess the impact of lower nitrogen rates and prescription nutrition. Tom Wells, nutrition agronomist from Origin Fertilisers, says trialling reduced nitrogen applications offers valuable insight for the whole industry.

"It might seem odd that a fertiliser company wants to carry out a trial advocating using less nitrogen, but if we can reduce it and still return similar results, or even increase the value of the end product, the fertiliser applied is more efficient."

CAN vs Sweetgrass

The trial compared a standard calcium ammonium nitrate (CAN) application to a prescription fertiliser called Sweetgrass, which includes sulphur and sodium. The aim was to assess if the prescription fertiliser could offset a 15% reduction in mineral nitrogen and still offer comparable returns, with outcomes measured in dry matter yield and forage quality.

The total nitrogen applied on the CAN area was 304kg/ha, whereas on the Sweetgrass area the total N was 259 kg/ha – 14.8% less. The CAN product contained nitrogen only, whereas the Sweetgrass was a 23 N + 5 SO₃ + 5 Na₂O. The trial took place on farm and represented typical growing conditions experienced last season.

Taking the lower nitrogen application into consideration, one of the most interesting outcomes of the trial was that the forage on the prescription area showed an increased nitrogen uptake during analysis, despite having less applied. Tom explains further.

"The grass was able to access more of the nitrogen more efficiently and reduce the amount of nitrogen that wasn't used. The term 'nitrogen use efficiency' is a popular one, but this is a clear example of where the crop has benefited from the inclusion of other nutrients to access a greater percentage of the applied nitrogen. It also reinforces that nitrogen isn't the only nutrient required by grass."

A large part of this increase on the prescription area is down to having additional nutrients at plant available levels, as nutrients such as sulphur assist nitrogen uptake. The prescription

area provided balanced nutrition for the grass with everything it requires to maximise returns, and there are significant benefits of applying this compared to a higher total nitrogen.

Dry matter improvements

Assessing dry matter % (DM) content in the forage highlighted that the prescription area returned 15.2%, while the CAN area was lower, at 13.7%. This equated to a DM yield benefit of 0.984t/ha, an increase of 13.3%, which could represent a sizable saving through growing better-quality forage.

The additional DM could be worth as much as £177/ha, based on DM value of purchased concentrate at £180/t, and analysing the results further reveals it's not just supplementary yield that farmers could benefit from.

“Grass is the cheapest form of feed on livestock farms, but only if the quality is correct to provide animals with as much nutrition as possible. The trial showed increases in crude protein, digestibility and energy, all key drivers to improving livestock health and performance, and we shouldn't forget that this has all been achieved by using less total nitrogen,” says Tom.

Part of the increase in these key metrics will be down to the forage being more digestible to the cows through the addition of sodium. Sodium improves the palatability of grass, therefore making it more attractive and easier to digest. This increases the intake levels for each cow, meaning the forage is helping each animal to produce more milk.

Farmers should be aware that the refined sodium salt in Sweetgrass differs from a traditional agricultural salt, as Tom explains. “The sodium in Sweetgrass contains a special coating that reduces the risk of it picking up moisture even when blended with a wide range of other nutrients. It is also size matched with N, P, K and S raw materials to reduce the risk of segregation and deliver an even distribution of granules on application.”

Sustainability

Crude protein increased by 1.8% to 21.1%, digestibility of the forage improved by 1.9% to 74.1%, and ME rose from 10.7% to 10.9%. However, the wider benefits to sustainability, and a reduction in greenhouse gas emissions, shouldn't be overlooked by farmers when deciding on nutrition.

Tom comments: “From a sustainability perspective, using less nitrogen will normally reduce greenhouse gas (GHG) emissions and we are lowering the risk of leaching nutrients into the environment by not applying excess nitrogen that isn't taken up by the crop. It also has financial benefits as nitrogen is often a costly nutrient, so using less product more efficiently will help the bottom line.”

The Sweetgrass fertiliser reduced GHG emissions by 14.8% compared with CAN, which shows that by using the right fertiliser and providing the crop with the nutrition it requires, it is possible to contribute to lowering on farm emissions through prescription fertiliser use. Farmers can reduce emissions through more targeted fertiliser and still achieve the same or better returns.

What is prescription nutrition?

Targeting soil nutrient deficiencies by using tailored fertiliser offers farmers the chance to maintain and improve yields through maximising the investment in nutrition products. Using

detailed soil analysis, Origin can match up to 15 different nutrients in a single product to correct any soil deficiencies.

“Grassland farmers using prescription nutrition are achieving great results. What this data has highlighted is the ability to lower nitrogen use and achieve more, but having the correct nutrition in place to help the crops is essential. Reducing nitrogen on its own can impact on yield, but by providing the soil with a wider range of the nutrients, we can ensure the grass is getting exactly what it requires.”