

# Changing our approach to Nitrogen

It will not have escaped people's attention that we are in unprecedented times with the spiralling price and limited availability of nitrogen fertilisers for the coming spring.



**Tim Kerr**  
(Hutchinsons Nutrition Manager)

**Something that has been relatively cheap and in plentiful supply is now far from either. Therefore, our approach to nitrogen management should reflect a response to the circumstances.**

Based on our current understanding of supply and pricing, **Tim Kerr** (Nutrition Manager) asks - what can be done?

Before top dressing commences, it is worth considering what we can measure to help fine-tune nitrogen recommendations.

## N-Min – what's in the soil?

The N-Min test is unique in that it measures both the soil mineral nitrogen, and also calculates additionally available N – providing a valuable insight into how many kgs of nitrogen the soil will supply over the season.

Where any forms of organic manures are used, or cover crops are employed, the N-Min test helps to remove the guess work as to how much soil mineral N will become plant-available. This can give you the confidence to tailor Nitrogen recommendations accordingly. Knowing the available N in your soil is key to optimising nitrogen applications.

## NDVI and GAI – what's in the plant?

The ability to measure the green area index or biomass of the crop gives valuable insight that can be used to further tailor N applications. Using GAI measurements – particularly on winter oilseed rape provides a good estimate of what nitrogen is stored in the crop – contributing to the calculation for spring N requirements.

## Yield potential

There are always areas of greater and lesser yield potential – often within a field. Identify areas with lower yield potential – and treat them accordingly – use N fertiliser to match the potential, not as a means of trying to improve poor growth.

## How much to apply?

Let us start by considering a typical nitrogen response curve-

The first 100 kgs of N applied gives the greatest response- on average a 2.75 tonne yield response of wheat – or 28 kgs of grain for every kg of N.

The next 50 kgs is likely to give a lesser response – but still 0.75 tonnes of extra yield – or 13 kgs of grain for every Kg of N.



Under normal circumstances it would still have paid to apply the next 50 -70 kgs – although the yield response is likely to be 0.5 tonnes. However, if N is costing £2 per kg – this is exceeding the optimum economic rate of nitrogen.

Therefore, knowing the value of nitrogen per kg – depending on what you have paid for it, and expected crop value– allows you to adjust the optimum N rate.

ADAS have produced the chart (below) that shows how the optimum N rate reduces as the break-even ratio for nitrogen increases – winter wheat the N-opt falls back to 160 kgs.

In trial work on Winter wheat at our Helix farms this year – 160 kgs of N gave a 5.75 tonne yield increase over the untreated, - whilst additional N added less than a tonne of yield – backing up what this chart is showing.

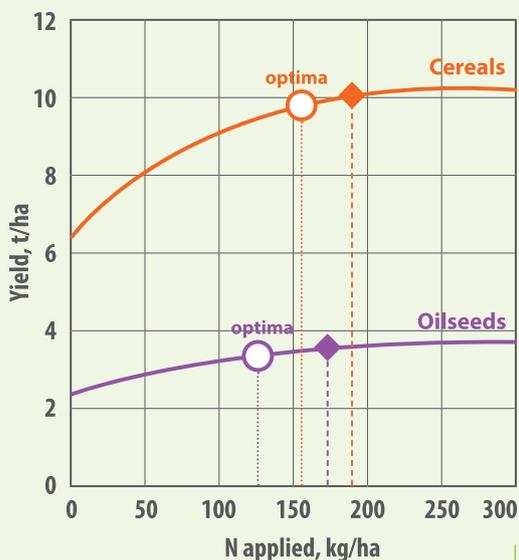


Chart 1 - How the optimum N rate reduces as the break-even ratio for nitrogen increases (Source: ADAS)

### Can N fertiliser be replaced?

The value of the yield response to the first 100 kgs of N applied as fertiliser and the relative lack of above ground biomass to take up foliar products, makes the decision for us – there is no better alternative to applying the first 100 kgs of N as fertiliser.

After the first 100 kgs, and as crop canopy expands, it does become possible to replace some of the conventional fertiliser with foliar N – be very mindful of crop safety and product efficacy. Foliage is sensitive to nitrogen, which is why we only recommend the use of products that have been proven to provide phased release nitrogen without the risk of scorch.



*We may learn to successfully manage with less nitrogen.*

### Nitrogen is not a lone worker

In order to achieve a high Nitrogen Use Efficiency – other essential elements need to be available to the crop, as invariably they are involved in the plant’s utilisation of Nitrogen.

If overall N rates are reduced – it is arguably even more important to ensure that other nutrients are not in short supply. Listed in no particular order:

**Phosphate** – P is critical in supplying the energy required for nitrogen assimilation – not enough P – wasted N.

**Sulphur** and Nitrogen are inextricably linked in producing the building blocks of protein – it’s a fixed ratio – insufficient S and there will be a reduction in nitrogen utilisation.

Adequate **Potassium** has been proven to result in a higher NUE.

A lack of **Magnesium** will reduce chlorophyll production – and consequently photosynthesis – reducing crop development.

Other elements like **Manganese** and **molybdenum** are fundamental in NUE – the message is do not scrimp on any nutrition that can improve the efficiency of nitrogen utilisation. Use soil, sap or tissue analysis to check for this.

It may just be that through the challenge of the current situation we learn to successfully manage with less nitrogen. Considering the need for farming to reduce its carbon footprint, this year might represent a crossroads for us all.

**If you would like advice on changing your own approach to nitrogen this season, please speak to your agronomist or contact us: [information@hlhlt.co.uk](mailto:information@hlhlt.co.uk)**

### Effect of Soil K on N efficiency

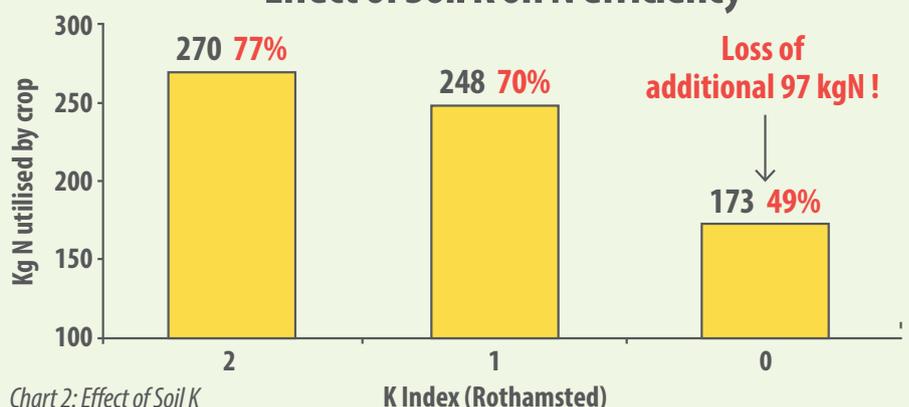


Chart 2: Effect of Soil K on N efficiency (Source: PDA)

# Spotlight on spring cropping options

After many growers got forced into spring cropping following wash out autumns in 2019 and 2020, better conditions for establishing winter crops this autumn were a welcome relief.



**Dick Neale**  
(Hutchinsons Technical Manager)

**While this will result in less dependence on spring crops in 2022, they remain important to the rotation on many farms, for agronomic, financial and logistical reasons.**

For those still to decide which crops and/or varieties to sow next spring, Hutchinsons technical manager **Dick Neale** and national seeds manager **David Bouch** highlight some options to consider.

## Spring barley

Barley remains the leading spring cropping option in many regions, especially those supplying malting, distilling and animal feed sectors. In recent years spring barley has also become a go-to option in less traditional areas among growers tackling black-grass.

"That's still the situation, especially as there will be some fields that have taken a backwards step for black-grass control after the difficult conditions we've experienced in recent seasons," Mr Neale says.

"If you're growing spring barley for black-grass control on heavy clay soil, don't rush out and get a malting contract then apply malting barley principles developed on predominantly light land. For black-grass control, focus on maximising yield and crop competition, which in turn will dilute grain nitrogen and can still make a good malting sample."

Pushing for yield does not necessarily require a lot of nitrogen - typically around 120 kg N/ha - but it does mean early drilling at higher seed rates into good conditions and a robust programme of fungicides and growth regulators, he notes.

In terms of varieties, Mr Bouch says the main options are largely unchanged from last year, with **Laureate**, **LG Diablo** and **RGT Planet** leading the way on yield, quality and acceptance by end users. "Yield, specific weight and screenings are all pretty similar, although Laureate performed exceptionally well last year."

Mr Bouch adds: "We've seen several new varieties come through, but none add much in terms of yield and most still need end user backing."

Newcomer **Skyway** is interesting given a 4-5% yield advantage over established favourites, however at the time of writing it was still being evaluated for brewing use. Likewise **SY Splendor** and **SY Tungsten**, which joined the Recommended List last year, also offer slightly higher yields, but still only have provisional MBC approval, he says.

## Spring wheat

There have been big improvements in spring wheat agronomy in recent years, with many growers achieving good results.

The crop is an efficient user of nitrogen, with most spring milling varieties able to achieve 13.5%

protein from around half the applied nitrogen usually required by winter milling wheat, Mr Neale says.

Given spring wheat's low tillering capacity, he believes success depends on high seed rates to ensure a strong established plant population and reduce the risk of ergot infection during flowering. Generally this means sowing 500-600 seeds/m<sup>2</sup>, which should produce yields of around 8 t/ha.

Group 1 variety **Mulika** is still a firm favourite, despite having spent 20 years on the RL, Mr Bouch says. Group 2 **KWS Cochise** picked up decent market share in 2021 and is likely to be popular again next spring, he adds.

Another Group 2, **KWS Giraffe**, joined the RL in 2020 and generated much interest, however with limited seed availability, it took only a small market share, which he expects to increase next spring. "It's got the protein and specific weight growers need, and although yield isn't the highest, it's still almost 10% better than Mulika."

**KWS Chilham** is another Group 2 worth considering, while for out-and-out yield, several familiar Group 4s attract support. "They offer highest yields, but proteins are not as exciting."

## Spring oats

The UK spring oat area is relatively small, so seed volumes are limited and tend to sell out most seasons.



The crop provides a partial break from wheat and barley that is relatively cheap to grow and can be highly competitive against black-grass, Mr Neale says.

"It doesn't need a lot of nitrogen, and disease-wise, the main focus is on keeping out mildew and rust, which should be fairly straightforward with existing chemistry. Standing ability is not too bad providing you adopt a sensible PGR programme."

Mr Bouch says **WPB Isabel** is one of the biggest selling spring oat varieties, and is likely to remain popular given its yield and quality, closely followed by **Canyon**.

Newcomer **Merlin** is attracting attention for its quality, so is worth considering, he adds.

## Spring peas

Recent years have seen many new combinable pea varieties launched, offering big yield improvements. "We've seen a 15-20% yield increase from new varieties in the past five years, so it's well worth considering what's out there and not getting stuck growing the same things," Mr Neale says.

The new white pea **Kameleon** for example, offers yields at 120% of control, which is well above established favourites like the large blue varieties **Bluetooth** and **Prophet**. "Peas can also be useful for black-grass control as their later drilling gives time to spray-off weed flushes pre-drilling."

Seed is one of the main expenses for spring peas and beans, so is often where growers try to cut costs. But Mr Neale cautions against this, as like many other spring crops, peas and beans have little time to compensate for low seed numbers, so cutting seed rates unnecessarily reduces yield potential.

"If you sow 100 seeds/m<sup>2</sup> and establish 80-85 plants, it should produce a good pea crop, however if you only drill 70-75 seeds/m<sup>2</sup>, yield's likely to be compromised."

## Spring beans

Spring beans remain a useful break crop, not least for the nitrogen fixation beans and peas offer. With little sign of nitrogen prices quickly returning to pre-2021 levels, more growers may consider leguminous spring crops to build fertility and reduce fertiliser requirements next season and beyond.

Mr Bouch says **Lynx**, followed by **Fanfare** were the biggest-selling varieties in 2021 and expects little change next year, despite the arrival of several new varieties, including **LG Raptor** and **Ghengis**.

"There are new varieties about, but they don't add that much over existing varieties and seed availability may be a challenge."

Spring beans, like peas, need high enough seed rates to maximise yield, Mr Neale adds. "Aim for 50-55 established plants/m<sup>2</sup>, but many growers are only sowing 40 seeds/m<sup>2</sup>."

Although peas and beans fix nitrogen, pay close attention to optimising macro and micro nutrition, he notes. Sulphur can sometimes get overlooked as it is usually applied with nitrogen. Molybdenum is also important for feeding bacteria in root nodules that fix nitrogen.

"Peas and beans are relatively easy to manage, but they shouldn't be seen as a low input option. You've still got to push crops."



*David Bouch (Hutchinsons National Seeds Manager)*

## Spring linseed

Spring linseed is a useful addition to rotations, as its agronomy is relatively straightforward, there is a wide window for weed control before sowing, and good market opportunities.

"Sown into warm, moist seedbeds, linseed can do very well," says Mr Neale. "But you've got to accept yields are never going to be massive - typically around 2 t/ha - and you must combine it carefully, picking the right conditions, using sharp knives and correct settings. That's particularly true with the loss of diquat, which was a more effective desiccant than glyphosate."

After 20 years on the market, **Juliet** remains the highest-yielding spring variety, Mr Bouch says. Another to consider is **Buffalo**, however that is 7-8% off in terms of yield.

**If you would like advice on spring seed choice and establishment, please speak to your Hutchinsons agronomist or contact our dedicated seed team: [seed.orders@hlhld.co.uk](mailto:seed.orders@hlhld.co.uk)**



**Hutchinsons Helix North** project is based at Hundayfield Farm, just outside York, by kind permission of Nick and Liz Wilson. The farm is in a nine year rotation that includes livestock and grass leys.



Nick Wilson

Trials at the farm are focussed on these key areas:

- 1. Use of TerraMap data to include carbon:** this has shown differences in carbon levels between arable and grass; levels of carbon in the grass ley being almost double that of the arable. With a baseline measurement it is now possible to look at how to use FYM or cover crops on the poorer areas to improve active carbon measurements.
- 2. Cover Crops:** these trials are looking at how to establish fodder beet after cover crops without ploughing to prevent carbon loss as well as overall effects on soil fertility.

**Helix East Farm** is hosted by Tom Jewers, of GD Jewers & Son in Rattlesden, Suffolk.



Tom Jewers

TerraMapping has been carried out across the farm and has raised some interesting questions for Tom:

- 1. Why high soil reserves of K are not matched in tissue sampling?** Indications from pH and Calcium maps are that there is some form of lock-up. This will be looked at in more detail.
- 2. Where to use nitrogen this year?** Historic yield data does not capture seasonality of yields, so inaccurate. Much better to use yield expectation maps and NDVI biomass maps in Omnia to highlight best performing parts of the field.

You can view a recording of the Helix Live webinar by registering your interest at our dedicated website: [www.helixfarm.co.uk](http://www.helixfarm.co.uk)

# Turning data into profit

Hutchinsons hosted a Helix Live webinar in November to share the outcomes from the Helix Project over the last year.

Increasingly growers are under pressure to make more informed and justified decisions surrounding their farm management practices – and ultimately more informed decision making leads to increased profitability.

## So how can they do this?

**Data.** However, it is critical that this data is interpreted between both grower and agronomist.

## How is the data collected? Technologies produce the data.

This is the very premise of the Helix concept. Launched two years ago, technologies that produce data are developed, tested and validated across seven Helix farms on a field-scale basis.

The aim is to produce the best solutions on issues such as soil health, farm diversity and carbon to improve farm economic and environmental sustainability.

## Helix outcomes:

**Omnia Climate module** – this drives modelling to look at risk linked to weather i.e. disease, BYDV and lodging. Crop growth modelling is also linked to the climate module by improving the prediction of key growth stage timings.

**TerraMap to include TerraMap Carbon.** *Why managing carbon makes good business sense.*

Within Omnia it is now possible to calculate the cost of production for a crop both financially (£/t & £/ha) and in terms CO<sub>2</sub>e (CO<sub>2</sub>e/ha & CO<sub>2</sub>e/t). This is called the **Production Module**.

Costs of production and levels of carbon in the soil are closely linked. Where input costs are efficient and output high, carbon levels reflect this and vice versa – managing carbon is good business sense.

## What's coming:

**Strategic Farm Planning Tool** combines rotational planning tools, carbon accounting and cost of production and analysis tools to visualise what effect they will have on overall farm profitability.

This is achieved through:

- optimised inputs to crop potential
- cost savings
- reduced risk
- sustainability
- managing carbon

**Yield prediction module:** Why is a quantifiable crop potential important? Currently it is only possible to predict yield about 30-60 days pre-harvest which is useful information – but does not help with the management of the crop.

However, modelling within Omnia is being developed for the future to allow for much more accurate prediction of a quantifiable yield – allowing inputs to be matched accordingly - to within a 10% accuracy level.

# Sugar beet

## getting weed control right

Weed control has always been a crucial part of sugar beet production and the consequences of getting it wrong can be very expensive in terms of root yield and overall sugar yield. Darryl Shailes (Root Crop Technical Manager) discusses using modern technology to solve the problem.

**Data going back several years shows that just 1 oilseed rape plant per m<sup>2</sup> can reduce sugar yield by 500kg ha and 2 fat-hen per m<sup>2</sup> reduce root yield by around 25%. So, getting it right and having weed free crops are critical to successful sugar beet growing.**

**In recent seasons we have lost some very effective actives in sugar beet.**

Chloridazon was a very cost-effective residual component of many weed control programmes and was the pre-em choice of many growers and agronomists.

Desmedipham has been around for several years and was a major component of many of our best contact materials and that was lost in 2020. Other products are currently under review and that, combined with restrictions in use in terms of max amount of ai per season and reduced doses of those that remain, has meant that weed control has become more expensive and more challenging.

Tractor hoeing is starting to become popular once more and the development of modern robotic hoes may well have a significant role to play in the future.

One piece of modern technology that is available now is **Conviso Beet**.

Conviso beet are herbicide tolerant beet that have come about with a collaboration between Bayer and KWS. Conviso Beet were launched into the UK in 2019 and have shown to be a robust technology adopted by many growers, giving excellent weed control with simpler management and less sprayer passes.

**Conviso One is the herbicide component** and contains 50 g/L foramsulfuron and 30 g/L thiencazabone-methyl.

Conviso One controls most weeds including volunteer potatoes, with the only significant gap being Common field speedwell, not a particularly competitive weed in sugar beet. It will also control weed beet and that has been the target for use by some growers.

KSW have developed the varieties via a conventional breeding programme when one beet from many millions was found to be resistant to the herbicide by a natural genetic mutation and have developed modern sugar beet varieties from this.

As with all new technologies in sugar beet, there is a slight yield lag against conventional varieties on the Recommended List produced by BBRO each season. When the first BCN resistant varieties were introduced, there was a yield lag but now many of the top yielding varieties such as Daphna are also BCN tolerant.

What is not widely understood is that the BCN resistant varieties in the Recommended List trials were grown in non BCN infected fields, so that the true benefit was not always measured.

A similar thing happens with Conviso beet, where in the Recommended List trials they are grown under a conventional herbicide control programme, so the true value of their herbicide resistance is not really measured. Conventional sugar beet herbicide can have a phytotoxic effect on beet under certain conditions as we know and can reduce the yield potential, but the beneficial effect of the herbicide in terms of weed control vastly outweighs the negatives.



*Darryl Shailes (Root Crop Technical Manager)*

Conviso beet are not affected by the Conviso One herbicide, so there is not the potential for phytotoxicity, and the true value of the technology may not be realised to its full potential in the Recommend List trials.

Currently there are two varieties on the recommend list for 2022 - **Smart Rixta KWS** and **Smart Janninka KWS**. Smart Rixta is yielding 92.2 % of the adjusted tonnes of the control varieties, but with no potential for phytotoxicity from conventional herbicides will perform better than this in many situations.

This could make the Conviso Technology a current and very Smart option for growers to exploit in 2022.

If you have questions about this article, please contact us: [information@hlhLtd.co.uk](mailto:information@hlhLtd.co.uk).

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