

# Real Results Pioneers

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“Our biggest driver was wanting to be a bit more timely and to improve accuracy.”

## Sensible nitrogen management

**Soaring nitrogen prices and Clean Air legislation are putting the spotlight on urea. CPM takes a look at how to manage both.**

*By Mike Abram*

**It's amazing how a year can change what a 'sensible' price for fertiliser feels like. This time last year paying around £300/t for 34.5% ammonium nitrate only felt sensible in hindsight, yet Berkshire grower Dan Willis is already describing his recent purchase of Limus-treated blended urea — which also contains 3% K, 1.5% Mg, 4.5% Ca and 12% S — at £646/t as a sensible price, albeit with a slightly ironic laugh and with his head in his hands.**

Selling some wheat forward for January 2023 at £340/t helps cover the cost of the purchase. “I can make enough forward sales to start budgeting those types of figures in the gross margin. I've got my base fertiliser secured, and if the wheat price does crash, I can choose whether to spread it.”

Economically, he says, it makes sense currently, particularly as it doesn't compromise product quality for value. “Treated urea and Polysulphate are both products I like and use, so having both blended together at sensible money feels like a bonus.”

He grows just under 200ha of winter

wheat at Rookery Farms, Curridge, just north of Newbury, on the 700ha farm, which also includes a significant proportion of spring crops.

On light sandy soils over chalk, he finds quality easier to obtain than higher yields, so about 80% of the winter wheat is KWS Zyatt, with the remainder KWS Extase. Both achieve milling quality premiums.

### Managing blackgrass

Establishment is with a Sumo DTS strip till drill, with very little cultivation carried out across the farm to maintain moisture. Managing the trash in stubbles pre-drilling is the key to success, he says. “It's allowed us to be more timely with drilling.”

Wheat is drilled later than historically on the farm now as blackgrass has crept in over the past 10 years — probably imported either in organic manures or compost, or brought onto the farm via machinery as Dan also supplies harvest contracting services.

“It wasn't uncommon for us to be finished drilling by the second week of September, but now we don't start until early to mid-October.”

While later drilling, along with spring cropping, has helped with blackgrass control, it has brought a downside in being the wrong side of a dry spring, with the farm relying on rain in April and May to maintain yields, he says. “Earlier drilled crops seem to weather a dry spring much more easily.”

That's despite an improvement in soil resilience through 20 years of rotationally applying organic manures and compost

across the farm. Rain in mid-May has helped ease some of the concerns over this year's crops, although the farm has only recorded 132mm of rain from January to mid-May — less than in 2020, which will impact yields, he suspects.

Nutrition is a key focus in any season, with Dan firmly believing in its role for healthy plants. This season has seen a change of approach with a partial switch to liquid fertiliser, facilitated by a new 30m John Deere 4140R self-propelled sprayer.

“Our biggest driver was wanting to be a bit more timely and to improve accuracy,” says Dan. “We'd seen our headland yields drop away over the years as we'd gone to wider tramlines. There was nothing ▶



*Dan Willis is already describing his recent purchase of Limus-treated blended urea at £646/t as a sensible price, albeit with a slightly ironic laugh and with his head in his hands.*



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▶ particularly wrong with the machine applying the fertiliser, but it was getting that edge-to-edge accuracy we were after with the liquid.”

Around 60-70% of his nitrogen requirements, both solid and liquid, were procured from Bartholomews early enough to be at last summer’s “sensible prices”, with more liquid ordered for the New Year. All the solid fertiliser is Limus-treated urea, which reduces volatilisation from urea fertilisers.

“We’ve used untreated urea over the years, but we’ve always been cautious and

waited for rain or temperatures to drop before applying it, and we weren’t always getting it on when we wanted to.”

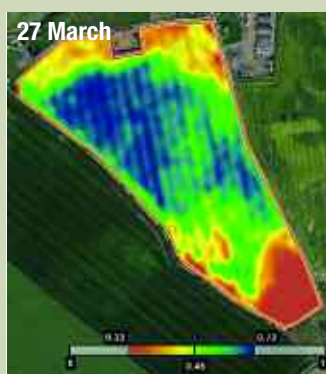
In contrast, using Limus-treated urea has given him the flexibility to apply it at any time during the season, he says, including last splits on winter wheat in May this season, leaving some liquid in the tank to top up the proteins if needed later in the season. “Most people will use urea early, but with this product you can confidently go late.”

He takes a little and often approach to his nitrogen programme in wheat, with

application timings calculated by working back in three-week intervals from a fully emerged flag leaf in mid-May, with a first application of around 30-40kg/ha in mid-February. “We aim to apply around 165-175kgN/ha by the third week of April.”

More frequent applications allow him to adjust rates to the prevailing weather. For example, in the dry spring of 2020 he stopped applying fertiliser in mid-April after two months without any rain, allowing carryover to the following season. “It wouldn’t have mattered if we had doubled ▶

## Real Results trials convince



NDVI images of the winter wheat trial site were taken throughout the season as part of the Real Results monitoring.

Two years of Real Results trials at Rookery Farms have confirmed the benefits Dan was already seeing from using Limus-protected urea across the farm.

In 2020, alternative tramlines were treated with either Limus-treated urea or ammonium nitrate in winter wheat (see table) in his little and often approach.

The average measured yield of the ammonium nitrate tramlines in the winter barley trials was 7.06t/ha, with Limus-treated urea increasing yield by 0.13t/ha.

A similar trial in 2020 in winter wheat saw yields of 6.77t/ha for the ammonium nitrate and a 0.28t/ha increase with Limus-protected urea.

These are similar results to other trials, says Jared Bonner, BASF business development manager for Limus. “Limus-treated urea is equivalent to ammonium nitrate, and there’s usually an increase over untreated urea of around 5%.”

That’s important for Dan. “There was a premium of around £20/t for protected urea over untreated. We’ve come away from untreated urea because it’s less efficient,

particularly late in the season.

“Now what we’re doing is efficient, and if we’re not seeing a difference to AN, it gives flexibility over what source of N to buy. I can look at p/kg and not be worried about efficiency. It’s certainly been good for us,” he says.

“There are no issues with spreadability and no fear you won’t achieve the result. It’s a good product,” concludes Dan.

### Rookery Farms, 2020 WB Real Results trial – Mushroom Field

Date	Nitrate (kgN/ha)	Ammonium nitrate yield (t/ha)	Limus protected urea (t/ha)
5 feb	69	7.06	7.19
7 Mar	46		
30 Mar	69		
19 Apr	46		
Total	230		

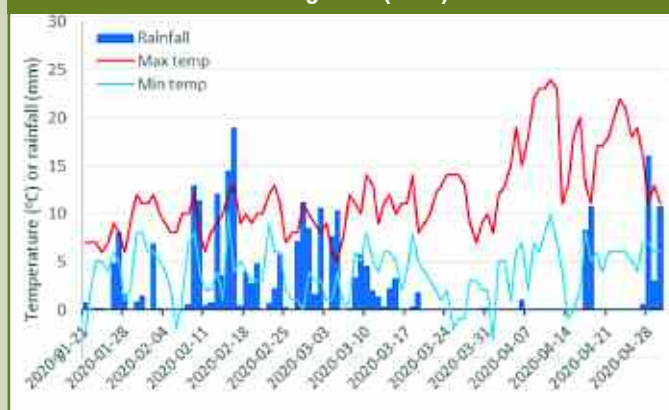
Source: ADAS Agronomics, 2020

### Rookery Farms – 2020 WW Real Results trial – Long Field

Date	Nitrate (kgN/ha)	Ammonium nitrate yield (t/ha)	Limus protected urea (t/ha)
5 feb	69	6.77	7.05
7 Mar	46		
1 Apr	46		
Total	161		

Source: ADAS Agronomics, 2020

### Weather conditions in Long Field (2020)



Rainfall and temperature conditions during the period of Limus-treated urea application.

Source: ADAS Agronomics, 2020





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*This season has seen a change of approach with a partial switch to liquid fertiliser, facilitated by a new 30m John Deere 4140R self-propelled sprayer.*

► our dose from thereon in that year.”

He has found a total dose of 220kgN/ha in four or five applications optimum, with the potential of an extra 20kgN/ha to top up protein levels if needed.

“Any more than 220kgN/ha base fertiliser feels like we’re wasting it — we’ve tried 280-300kgN/ha and it isn’t giving us any more yield. It’s tough to get more than 10t/ha on this land, so we have to be cautious in what we spend — that’s our margin.”

Last season he used Hill Court Farm Research’s root analysis just after flowering, which predicts grain protein levels in wheat. That influenced his decision about topping up for proteins saving around 20t of Nufol, with only 50% of his wheat treated. “I put a lot of trust in it, but our proteins were 12.8-13.2% with an average yield of 9.1 t/ha.”

He’s also making use of other analyses —

## The Real Results Circle

BASF’s Real Results Circle farmer-led trials are now in their sixth year. The initiative is focused on working with 50 farmers to conduct field-scale trials on their own farms using their own kit and management systems. The trials are all assessed using ADAS’ Agronomics tool which delivers statistical confidence to tramline, or field-wide treatment comparisons — an important part of Real Results.

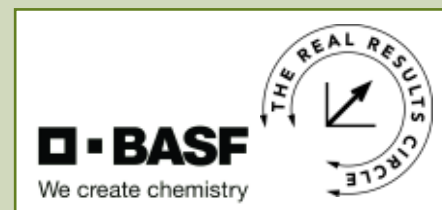


In this series we follow the journey, thinking and results from farmers involved in the programme. The features also look at some other

related topics, such as environmental stewardship and return on investment.

We want farmers to share their knowledge and conduct on-farm trials. By coming together to face challenges as one, we can find out what really works and shape the future of UK agriculture.

To keep in touch with the progress of these growers and the trials, go to <https://www.agricentre.basf.co.uk/en/Real-Results-Circle/> or scan the QR code.



N-min tests were taken for the first time this autumn. “It was quite an eye-opener. We’ve got one field where we’ve gauged our nitrogen use totally on the result and we’re going to end up about 140kgN/ha.”

Tissue analysis has been used for longer, with more focus being put on trace elements applications partly to help utilise nitrogen more efficiently. “It gives us a good guide before the main timings — we routinely tissue test around GS23-24, GS30-31 and GS39, so we can top up what’s missing.”

Manganese is always required on his light land, with typically five or six applications required during the season. “Thankfully it’s

not an expensive problem to solve.”

Sulphur is the other main focus, with the aim of having a 3:1 ratio of nitrogen to sulphur. That’s been achieved through switching to a combination of 24% or 26% N, with 7% or 8% S, liquid fertiliser, and applying 120 kg/ha of slow release Polysulphate in the autumn and 125kg/ha again in February for a total of 70-80 kg/ha of sulphur.

“Sulphur is something we’ve upped more and more, but now we’re getting best use of our nitrogen — we’re seeing the result in the crop and in the tissue analysis,” he concludes. ■

## What’s the issue with unprotected urea?

Ammonia emissions are responsible for effects like smog, eutrophication, and damage to sensitive habitats, which is why there’s a statutory obligation to reduce ammonia emissions by 16% by 2030 in the UK, as part of the government’s Clean Air Strategy.

Around 87% of ammonia emissions in the UK are said to come from agriculture, with solid urea fertilisers responsible for 8%.

Unprotected urea can release ammonia into the atmosphere, particularly when applied in dry conditions through the activity of urease enzymes, explains Jared.

While this reaction is necessary to convert urea into plant available ammonium, if it happens on the soil surface, it causes a localised rise in the pH of the soil around the granule. This spike will lead to ammonia volatilisation unless the fertiliser is washed into the soil by rainfall, buffering the pH spike.

Limus, which contains two urease inhibitors, NBPT and NPPT, minimises this volatilisation by

temporarily delaying the conversion, effectively blocking the urease enzymes on the soil surface, and buying time for it to be washed into the soil, says Jared.

“As soon as you get moisture the urea granule effectively melts into the soil, where billions of these ubiquitous urease enzymes swamp the Limus inhibitors, converting urea into ammonium.”

While the effectiveness of Limus varies with environmental factors, such as soil type and length of dry spell, BASF trials have shown reductions in ammonia emissions — on average by 70%.

The product is available for both solid and liquid urea, says Jared. Pre-treated solid urea is available through Bartholomews, Thomas Bell and COFCO, while the option for liquid UAN, Limus Clear, is sold through Frontier as an additive which the farmer can decide whether to use based on environmental conditions at the point of application.



*Limus-protected urea contains two urease inhibitors, NBPT and NPPT, which minimise volatilisation by temporarily blocking the urease enzymes on the soil surface, and buying time for it to be washed into the soil.*

From next season there will be restrictions on the use of urea-containing fertilisers. Unprotected urea can only be applied between 15 January and 31 March, with only treated/inhibited urea used outside that period, unless an agronomic justification is provided by a FACTS qualified agronomist, explains Jared. “That’s likely to drive an increase in the use of all inhibitors.”