

# Managing crops with low yield potential

*The headline may appear defeatist from the off, but the wet 2023-24 autumn and winter period will impact many crops already sown and those intended to be sown in the coming spring, says **Dick Neale** (Hutchinsons Technical Manager).*

**As I write, there are over 300 active flood warnings across the UK and it is the fact that saturated or waterlogged soils are impacting so much of the UK that makes this cropping season so unusual compared to the recent wet autumns of 2012, 2019 and 2020, which were far more regionally focussed.**

As well as being country-wide the duration of continued wet soils is unprecedented.

It is the impact and reality of the extent of saturation or waterlogging I will address in this article, as the effects will be apparent in all autumn crops on all but the most rapid draining soils.

The impacts of this season's conditions go far beyond the simple implications of delayed drilling for grassweed control, disease tolerance or reductions in BYDV impact.

Whilst in need of constant review, the diverse range of soil cultivation systems employed across the UK are equally affected by the current conditions ...be it plough based or direct drilled, crops have failed to establish across all systems.

For the long term, we must continue to review how we build resilience into our soils to cope with both excessive wet and excessive dry periods, as climate change is undeniably increasing the frequency of both. We will continue to address that subject over the coming year, but for now I will focus on this season's likely crop impacts.

## **We got caught with our trousers down!**

After a season where grassweeds again reared their head across significant areas of UK cereals, the

need for delayed drilling again became the default choice. However, having delayed drilling until mid October, with a very large hectareage drilled from the 15th – 18th October prior to forecast rains, when the rains hit on the 20th October that hectareage was highly vulnerable, almost regardless of cultivation technique ...it was the seeded zone that took brutal punishment. Relentless rain at high volume with strong winds decimated recently moved soil aggregates that were already in a moist condition. Soil surface degradation was rapid and soil particles quickly plugged soil pores at the base of the seeding zone, retaining excess water around the freshly planted seed for days.

Exactly the same scenario unfolded for drilling on the frost in mid-December.





**Dick Neale** (Hutchinsons Technical Manager)

## Action points

- Inspect individual crops and fields
- Set appropriate yield targets
- Use the spade to check soil condition
- Check rooting depth, plant and tiller numbers
- Are headlands worth keeping or drilling?
- Talk with your agronomist and make a plan
- Don't compromise autumn '24 with late drilled spring crops
- Utilise summer covers in all uncropped situations.

▶ If waterlogged for any longer than 4 days, around 40% of sown seed will fail to germinate, the extended period of waterlogging last autumn resulted in almost total seed loss.

## Yield potential

The ongoing saturation of many soils, even where crop was successfully established, must be taken into account when assessing the potential yield of a crop.

The importance of the 'foundation growth period' is very well established. Extending from sowing to glume primordia in the spring at around GS30 in cereals, but this period is critical for all autumn crops. Crops use this period to establish roots, leaves and tillers in preparation for a rapid building of biomass during the canopy expansion phase from stem extension.

The 2023/24 foundation phase has been compromised, even where crops have been evenly established, relentless rainfall has filled soil pore space to the exclusion of oxygen and where soil capping has occurred the exchange of gases, CO<sub>2</sub> to air and oxygen to soil, will have been compromised.

As water continues to replace oxygen in the pore space, hypoxia occurs leading to low energy exchange, reduction in nutrient availability or movement of nutrients down the soil profile, stomatal closure and reduction in CO<sub>2</sub> uptake, leading to reductions in chlorophyll production and low energy production. Without adequate energy the plant growth slows, roots fail to penetrate deep into the soil and leaf and tiller production is low, compromising the biomass building phase in the spring.

## Redox potential

Oxygen has the capacity to oxidise components in the soil and is vital to the decomposition of organic matter and the processing of nutrients ... this is measured as the soil's Redox potential and refers to the soil's ability to reduce or oxidise elements within the soil. Low oxygen and reduced Redox leads to denitrification and production of hydrogen sulphide and other toxins ... to some extent this will be happening in many soils and will compromise the plant's ability to grow and thrive.

Microbiology also relies on adequate oxygen levels to grow and thrive, enabling it to carry out the many beneficial soil processes with which it is associated ... nutrient cycling, aggregate building and rhizosphere association to encourage both root growth and function.

As all these functions breakdown, or become compromised, the soil's physical state is also negatively impacted. Soil pores, fissures and aggregates collapse as waterlogging continues, this increases the soil's bulk density which in turn restricts the roots' ability to penetrate the soil or for gas exchange to occur. We are potentially in a spiral of vicious circles!

The point of highlighting all the issues brought about by degrees of soil saturation or waterlogging is to ensure we are realistic about cropping potentials for the coming year and that any agronomic interventions are appropriate and worthwhile ... a spring foliar 'pick-me-up' of Mn and Mg is simply not going to cut it where more fundamental problems are at play.

Individual crops and fields still to be drilled must be inspected for soil issues ... is standing water an infiltration issue or a drainage issue? The approach to rectification will be very different.

Be patient, at 5°C soil temperature newly sown seed will take around 4 weeks to emerge ... you cannot afford another 4-day saturation period during that time.

**Questions about this article? Please contact us: [information@hlhlt.co.uk](mailto:information@hlhlt.co.uk)**

# Variable nitrogen could prove its worth this spring

*Variable-rate nitrogen applications could be a valuable tool for managing uneven growth of winter cereals and oilseeds this spring, says Omnia digital farming manager, **Aidan Monaghan**.*



**While some crops sown before the weather broke last October have established well and show good potential, others struggled where seedbeds were compromised, or land suffered prolonged waterlogging or flooding, he says.**

“There’s huge variation out there and some pretty sensitive crops that need managing carefully. Using variable nitrogen applications to even growth up and optimise yield potential has a much stronger role in a year like this.

“All winter crops can show a response from variably applying nitrogen, but the biggest benefits are when there is more variation. This year is almost the perfect opportunity for variable nitrogen, even if you’re already using variable rates elsewhere, such as for seed.”

## Establishing a baseline

When planning nutrition strategies, Mr Monaghan recommends first establishing a baseline for each field and crop.

Omnia users can do this by accessing NDVI satellite imagery for any fields saved on the system.

“Satellites pass over frequently, providing a regular supply of new images throughout the year, provided the skies are clear enough. Even images taken when crops are relatively small coming out of winter can provide a useful starting point to show in-field variation before anything starts growing.”

Early mapping could also highlight any areas where crops have been damaged beyond repair and are better being re-sown, rather than receiving any further inputs, he adds.

NDVI maps can be further supported with results from Soil Mineral Nitrogen (SMN) testing, or later in the season, tissue, sap, or in-field chlorophyll tests. “It all helps build a picture of crop health and nitrogen requirements throughout the season.”

## Varying applications

There are different approaches to variable nitrogen, depending on the requirements of individual crops and field situations.

The traditional approach in winter wheat is often to variably apply the first couple of doses, upping rates on thinner areas of crop to build biomass, while cutting rates on thicker parts, to generate more even canopies.

However, because residual nitrogen levels this spring are likely to be lower than normal after the wet winter, which will have increased leaching losses, Mr Monaghan feels most fields will benefit from a good early nitrogen dose to get crops moving.

“The best approach might therefore be to apply a flat rate first, then vary the second application to even crops up, before tailoring the final nitrogen applications to the yield potential of specific areas of crop.”

Hutchinsons fertiliser and crop nutrition specialist Rob Jewers agrees, adding that most trials over multiple years show a clear benefit from “front loading” nitrogen at the start of the season to build biomass and support tiller retention during the crucial foundation phase. This then allows subsequent doses to be varied according to yield potential and end user requirements.

“It’s not just soil nitrogen that could be much lower this spring,” he adds. “Other nutrients are likely to be in shorter supply given how wet it has been, so there could be a strong case for using a nitrogen, phosphorus, potassium and sulphur compound fertiliser to give crops a bit of an all-round nutritional boost.”



**Aidan Monaghan**  
(Omnia Digital Farming Manager)



**Rob Jewers** (Crop Nutrition Specialist)

Mr Jewers points out that NDVI imagery could be useful this spring for highlighting any areas of crop that have failed to establish completely, or have been lost to flooding, before fertiliser is applied. Fields should be walked to

double-check whether there is any viable crop remaining, and if not, application plans can be set so that no fertiliser is applied to bare areas.

However, saving fertiliser is not the main aim of variable rate applications, he notes. "It's about using the technology to even-up crop growth through the season, tailoring inputs precisely to crop requirements to optimise yield potential."

This can bring other management benefits, such as reduced lodging or more even harvesting, and help growers improve overall nitrogen use efficiency (NUE).

"Typically, NUE is around 55-60%, but a good target is 75-80%; any more than that and there is a risk that you're starting to 'mine' the soil's reserves. Omnia is a really good tool for helping you calculate the NUE for individual fields."

The approach to variable fertiliser applications may be slightly different in oilseed rape, as crops often receive just two main applications, Mr Monaghan continues. "Providing there's good establishment, I'd look to even crops up by variably applying the first dose, then adjust the second dose according to expected yield."

"The key is to establish that early baseline, then keep reviewing crops and their yield potential as the season progresses, using the

NDVI imagery in Omnia, and any other information, to plan the most appropriate strategy."

## Simple setup

For farms not yet using variable fertiliser applications, Mr Monaghan says there is a relatively simple and cost-effective solution in **Omnia Connect**.

The system requires just a GPS-enabled iPad, an Omnia Connect WiFi connector, and associated cables, to allow any solid fertiliser spreader with a control box to do variable applications.

Variable rate plans are created in Omnia, then easily transferred via the cloud to an iPad in the tractor cab, which sends information to the spreader's control box via the Wifi Connect. The system is easy to install and move between tractors if necessary and is compatible with a wide range of machines.

**For more details about variable fertiliser applications, please contact your agronomist or Omnia representative, alternatively please visit the Omnia website:**

<https://omniadigital.co.uk>



**George Baxter** (Hutchinsons Agronomist)

Open out boom and check for general condition of joints, pivots etc, and boom movement, which should move and reset itself to the centre.

It's important to inspect and jug test the nozzles for damage and check that they are within tolerance for desired application rates, cross reference the flow rate against manufacturers' data. Check that nozzles are correctly aligned.

**Don't forget correct PPE and complete first aid kit. Your sprayer should have a NSTS certificate, check that this is in date and book a test where appropriate.**

# Key Sprayer Checks

**Q:** *What are the key points to check on my sprayer before the season starts? Agronomist **George Baxter** answers:*

**A well-maintained sprayer, correctly set up, is essential for accurate application, to get the best and most cost-effective control with minimal waste and avoid any risks to the operator, any bystanders and the environment.**

First things first, get the sprayer out of the shed! Walk around it and check all the components individually for cleanliness and condition right through from the hitching and steering points on a trailed or mounted sprayer, through to tank, filters, and hoses etc. Check PTO guards are in good condition.

Tyres should be at the correct pressure. Don't forget to check the tractor tyre pressures if using a mounted sprayer. Beacons and work lights should be in good condition.

Make sure the tank is empty and clean. It's always worth operating the sprayer with clean water to check on-off mechanism and anti-drip valves. It's best to run the sprayer at a minimum of 5 bar to check for leaks. If there are no leaks, pressurise the sprayer to operating pressure to check that the pressure reading (gauge or electronic) is operational and correct.

# The importance of early disease management

*David Howard (Hutchinsons Head of ICM) considers the often-overlooked T0 fungicide treatment period.*



*David Howard (Hutchinsons head of ICM)*

**The very wet winter has produced wide variability within crops and assessment for disease management must therefore be on a case-by-case basis.**

The T0 (GS30-31) application is often an application that can be missed due to inclement weather, speed of crop growth and, because it's protecting lower leaves which contribute less to yield than the upper 3 leaves, its overall contribution to final yield is often considered to be quite small (0.1-0.3t/ha).

In difficult seasons, it can be the first input to be removed to allow more of the budget to go to the remaining disease management program. Although this might appear to make financial sense, it is important to consider what risks that crop will be facing.

Due to the rainfall patterns we received across much of the country last year, drilling was largely delayed, which increases the risk of rust at the expense of septoria. We have also had some cold weather over the winter period, but overall rust risk will be determined by how many days below -5 °C your area has accrued. Achieving 6-10+ days can reduce rust risk significantly. This means we need considerable cold for a prolonged period to see a significant reduction in pressure.

The GS 30/31 timing is becoming a much more important application because of the impact it can have on the rest of the spray program,

particularly where the season proves to be a difficult rust season. The main reason for this is the unpredictable nature of rust.

Since we saw the first insensitive isolate races like warrior race, Kranich etc some 12 years ago, it has been exceptionally difficult to predict which varieties and situations we would see it appear in each year. Genetic diversity in rust isolates continues to proliferate and because of this we are seeing the more rapid breakdown of specific varietal resistance, including when in the plant's life that resistance will begin, with some varieties gaining and losing juvenile resistance classification. Some of these more diverse isolates also appear to cycle more quickly, meaning rust epidemics can appear unexpectedly in crops.

The value of the GS30-31 spray timing was very evident in a recent trial where the significant pressure really highlighted the effect that the early application can achieve.

We placed a trial at Terrington, Norfolk, to evaluate the value of T0 in rust management and to answer the question of whether a missed T0 could be replaced by an enhanced rust active T1. When facing high yellow rust pressure, a 1.5 t/ha yield benefit was attributed to the addition of T0 disease management to the fungicide program. This was in a plot of KWS Kinetic (rated 4 for yellow rust) and in a high rust risk area, but it does prove the point that early disease intervention can pay dividends later.

The trial compared a full programme (T1-T3) with and without a metconazole-based T0. We should not, and cannot, expect later sprays to do all the work either. In the same trial, where no T0 was applied and a strong rust-active T1 was used to knock disease back, it still did not perform as well as where a T0 was used.

Considering the historical average yield response from T0 fungicides is considerably lower, the Terrington result may be rather unexpected, but it highlights the variability long-term averages can mask, and how challenging rust management can be once it has built in the crop. This year, crops which have been affected by waterlogging and associated crop stress are likely to be highly variable all the way down to within field level. The impacts caused by these sorts of stressors tend to take a long while to improve and there is a strong chance we will see crops spend long periods at different growth stages related to the level of stress they underwent. This reinforces the need to adapt crop management to every season and situation.

**Questions about early disease control? Contact us: [information@hlhlt.co.uk](mailto:information@hlhlt.co.uk)**



# Fieldwise Answers

Pot (right) - has received no sulphur (image Yara UK)

## Sulphur Nutrition

In 2023, unprecedented levels of sulphur deficiency symptoms were observed across the UK. In light of this, here we deal with a few commonly asked questions on the subject of sulphur.

### Has the high rainfall of recent months had an impact on the soil sulphur supply?

**In a word – Yes.**

Soil sulphur consists of organic and inorganic fractions. The inorganic sulphur primarily consists of sulphate which is the form that plants utilise. Sulphate is also the form of sulphur that can be lost through leaching. Sulphate is an anion like nitrate and leaky soils that struggle to retain nutrients will undoubtedly have lost more sulphate as well as nitrate because of the wet winter. Leaky soils have low clay and organic matter content.

Up to 90% of the soil's sulphur supply is in the organic fraction – over time mineralisation will decompose the organic S to release inorganic sulphur. This process is largely governed by soil moisture and temperature. In saturated soils which are consequently largely anaerobic, instead of converting to valuable sulphate, sulphur mineralises to sulphides and volatile compounds that are invariably smelly and of no value to plants.

Where mineralisation takes place in wet soils, the usual release of sulphate simply may not happen soon enough to meet crop requirements. This will be exacerbated if soil temperatures

are below 6 degrees centigrade. Therefore, many are facing a double-whammy this spring where the sulphate that is plant available is likely to have leached out of the rooting zone and will not be replaced from the organic fraction soon enough to meet crop requirements.

### When should I be applying sulphur to crops drilled in February and March?

**Do not delay and do not omit sulphur.**

Sulphur is essential to the efficient utilisation of nitrogen and should feature in every nutrient management plan this spring. As a result of the very likely lower levels of sulphur in the soil (see above) an early application of S should be considered – in general sulphate should be applied at similar timing to nitrogen. Nitrogen/ sulphur fertilisers are an ideal way of doing this. Many growers use the little and often approach with sulphur – which minimises the risk of spring leaching of S.

NS products are not the only way of supplying sulphur – where a maintenance application of potash is required, Potash Plus (37% K 23% SO<sub>3</sub>) is a great way of meeting both K and S requirements.



Tim Kerr (Hutchinsons Nutrition Manager)

Where recommended nitrogen rates are lower than originally anticipated due to drilling date or yield potential, less sulphur than usual may be needed – a simple formula for sulphur is to ensure that the application rate of sulphate is in a ratio no higher than 5:1 with nitrogen – so 150 kg of N would want a minimum of 30 kg of SO<sub>3</sub> (that minimum ratio should be 3:1 for oilseed rape and other brassicas).

### Should I be applying sulphur to peas and beans?

**Definitely.**

Legumes can fix nitrogen to meet their N requirements but rely wholly on the soil for all their sulphur needs. With lower than usual soil sulphur supplies for many, a spring application of sulphur will be key to optimising yield. On low K soils, Potash Plus (37% K- 23% SO<sub>3</sub>) is ideal. On other soils, polysulphate (14% K – 48% SO<sub>3</sub>) is probably the best option (100 kg/ha for most situations). Early spring applications of both products are recommended as the sulphur is released over time from the polyhalite mineral which is in both products.

**If you have questions about sulphur nutrition, please speak with your agronomist or contact us: [information@hlhlt.co.uk](mailto:information@hlhlt.co.uk)**

For more information on any of our products or services, please contact your local Hutchinsons agronomist, or contact us at:

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