

Maximising the synergies of sulphur



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ALLISON ARDEN

According to the Met Office, 2026 has seen parts of the UK endure the wettest start to a year on record. With concerns regarding nutrient losses increasing, growers are urged to prioritise sulphur as evidence builds around its role in boosting crop resilience. *CPM* reports...

By Rob Jones

While it's a given that when it rains soils lose nutrients, it doesn't mean it's time to panic and over-compensate through fertiliser applications, especially in these sustainability-sensitive times, suggests Allison Arden of Navigate Eco Solutions.

She believes it's more important to take stock of the individual farming picture and all-available farm resources, then develop a plan for how these can be best utilised to complement bought-in inputs and maximise NUE.

That's where a greater understanding of the interactions between nutrients and soil biology is key, in particular, the growing role of sulphur supply in the overall crop nutrition equation, adds Allison.

“There have been periods of very cold weather during last autumn and the start of the year in most

locations, so mineralisation of nitrogen effectively ceased, plants stopped growing and, on lighter textured soils, a large proportion of soil nutrients have likely been lost from the system in the relentless rain that followed.

“That said, many areas of the country had a good autumn and most crops established well, developing large, above-ground canopies. These crops have already captured a lot of nitrogen, with much of this likely to be carry-over from 2025 when it was so dry in early summer that much of what was applied didn't have the opportunity to get into the crop.”

Although there's no denying that nitrogen will have been lost from the system during the start of 2026, other major nutrients are likely to have been affected, too, she says.

“Nitrogen and sulphur behave

the same in the soil and are very mobile when conditions are wet. Calcium and potassium can also disappear, particularly in lighter textured soils where you can't actually build the index up easily.

“We know the correct balance between S and N is essential to increase and optimise NUE, and if sulphur is depleted, yield and grain quality are likely to suffer. Soil biology also has a demand for sulphur for its own viability, and there's complexity around how much becomes plant-available as organic matter, processed through the activity of soil microbes.”

While the national picture of the recent rainfall is well documented, there are significant regional variations and growers will have to understand their own individual situations as best as they can, she urges.

“If you haven't yet had a chance to sample for major nutrients and pH due to the weather, it's still worth doing in spring, providing you haven't applied recent manures or fertilisers, and the soil is moist, not wet.

“Get all organic material due to be applied tested too and you can then make an initial plan about how you're

going to approach nutrient applications.

“There’s no point chasing a production target that you’re unlikely or never going to achieve. You’ll waste money on inputs that won’t be used, and risk losses to the environment. Equally, don’t underestimate, or you won’t realise the full potential of your crops.”

With this in mind, growers can utilise the latest addition to the NavigatePro nutrient planning and management software – the Nutri-Smart module, suggests Allison.

“You have to effectively leverage the resources you have on farm within your overall fertiliser policy to get the best out of bought-in inputs. It’s all about balance, and using the right products to deliver the right nutrients in the right ratios, and that’s what Nutri-Smart can help with.”

Professor Jorgen Eriksen of the Department of Agroecology at Aarhus University, Denmark, says while growers are being encouraged to make greater use of organic sources of fertiliser, in reality, they contain very little plant-available sulphur. This means supplementation is essential.

“Animal manure isn’t a great source

of sulphur as a significant part of it is in the organic form which isn’t immediately available to the plant. When you apply fresh manure, there’s some content of plant-available sulphur but the longer it’s stored, the less of this there is and the more of the unavailable organic forms there are.

“These other non-sulphate forms will of course contribute in the longer-term when they become mineralised in the soil, but they aren’t immediate sources and it could take several years before plants are able to utilise the sulphur they contain,” he explains.

Agrii national fertiliser manager, Tom Land, says that while sulphur is important in boosting NUE, the role of potassium mustn’t be overlooked either. Put the two together, and there’s a real synergy, he highlights.

“Trials carried out by the International Potash Institute (IPI) have shown when N and K are applied separately, yield is increased with both elements. But when they are applied together, the increase in yield is greater than the sum of them independently.

“In some trials, this yield increase



Staying alive

Soil biology has a demand for sulphur for its own viability, comments Navigate Eco Solutions’ Allison Arden.

has been as much as 1.0t/ha compared with when the nutrients were applied in isolation. We know potassium improves fertiliser use by enabling better nitrogen uptake and utilisation, with NUE improvements typically in the region of 10-40%.”

The importance of sulphur in the NUE equation is also demonstrated through nitrogen not being able to be taken up

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Decoupling N and S

Farm manager Mark Atkin of Bourton Hill farm has been focused on optimising crop nutrition, with this season marking the start of a series of new trials

With 600ha of arable production at 800' above sea level, ensuring crops get away to the best start and maintaining momentum through what can be a challenging growing season is key, according to Gloucestershire-based Mark Atkin.

He believes the farm's fertiliser practice is playing a major role. "Although we're fairly central location-wise, we're about two weeks behind the average for the UK in terms of growing season.

"That shapes a lot of our decision making, as does the need to keep on top of blackgrass. Therefore, we're usually drilling into the middle of October, choosing varieties that we know have the vigour to establish well.

"Liquid fertilisers have been used for more than 10 years with improving NUE being a key goal. Use of the nitrification inhibitor Liqui-Safe has also

helped to improve this and simplify our fertiliser policy in recent years, but I'm always open to new ideas."

Mark adds that he's used two applications of 27-12 NS liquid fertiliser in cereal crops to deliver 220-240kgN/ha and the associated sulphur in recent years, but has started to use Polysulphate in peas, with a 0.5t/ha lift in yields.

"This year, the plan is to replace the NS fertiliser with straight liquid N and apply Polysulphate separately. This means our sulphur application rates are no longer tied to how much nitrogen we apply."

Mark's agronomist, Oliver Fairweather of Agrii, says the concept is to improve the precision and cost-effectiveness of fertiliser applications while lifting NUE further. "There's compelling evidence about the impact of Polysulphate on NUE. We've seen strong results in other crops on the farm, so this year all the



Total control

Separating nitrogen and sulphur applications gives total control over the rates used for both, says Agrii's Oliver Fairweather.

wheat and spring barley will receive it.

"Separating the nitrogen and sulphur applications gives us total control over rates used for both so we can match crop demands precisely, but by using Polysulphate, we can also benefit from getting some fresh potash into the light Cotswold brash soils on the farm," he concludes.



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► and used efficiently without it, but Yara tissue sampling suggests 85% of crops are now sulphur-deficient, raises Tom.

"In our own trials with winter wheat, we've seen appropriate sulphur applications producing yield gains of nearly 1.7t/ha compared with the control. Furthermore, an increase in the number of heads/ha approaching 20%, so 430/ha compared with 362/ha.

"The high sulphur mineral, polysulphate, is undoubtedly an increasingly popular way of addressing S deficiencies alongside K, while also allowing growers to benefit from the combined effect of both nutrients on N utilisation," he says.

Polysulphate's unique multi-nutrient analysis of 48% S03 and 14% K2O, alongside 17% CaO and 6% MgO, gives advantages, adds Tom. "For a start, there's its high sulphur

content, but the other nutrients help, particularly in years such as this.

"Not only can it help to replenish nutrients lost from waterlogged soils, it also releases its nutrients relatively slowly so they can always be available throughout the main growing periods."

Allison agrees, commenting that many people now use Polysulphate. "Another advantage is that you can separate sulphur applications from your nitrogen source, which you can't with nitrogen sulphur (NS) products, so S levels are no longer dictated by how much nitrogen you're applying.

"That's important in these more environmentally-focused times and when you are trying to get the most out of every kg of fertiliser applied."

Richard Ward of ICL

says as well as improved NUE and better root development, Polysulphate delivers significant other benefits too.

“It can be applied from February through to April at a recommended rate of 100-150kg/ha of product.

“University of Nottingham trials indicate that more than 50% of the sulphur contained in Polysulphate is available in the first 12 days after application, with the remainder released during the following 6-8 weeks.

“This matches nutrient availability precisely to crop demands through the growing cycle, which is in contrast to traditional NS products, where 100% of the sulphate is released within just 5-6 days after application.

“This sudden release not only means many of the applied nutrients will never be taken up by crops, it also increases the possibility of soil nutrient loss and potential environmental problems,” he explains.

A particular benefit of Polysulphate, is that it's a natural granule, which is why the release of the nutrients is more prolonged than from manufactured products, points out Richard. “It simply takes longer for the granule to dissolve into the soil than a re-constituted fertiliser. It's important to understand this, as the term solubility is often misused.

“Polysulphate is fully water soluble but with an extended release of nutrition that is ideal for UK agriculture, and is why farmers have seen such great results for more than a decade.”



A widespread problem

According to Agrii's Tom Land, tissue sampling suggests 85% of crops are sulphur-deficient.

According to Richard, an additional benefit of it being a natural product is that Polysulphate also has the lowest

carbon footprint of all equivalent fertilisers, at just 0.0029kg/CO₂e. This makes it virtually carbon free, he says.

“When it comes to getting the most from organic fertilisers, latest trials suggest adding Polysulphate to slurry applications can reduce ammonia emissions from the practice by 50%, as well as providing the vital sulphur nutrition such sources lack,” concludes Richard. ●



Plant availability

While growers are encouraged to make greater use of organic sources of fertiliser, in reality, they contain very little plant-available sulphur, points out Professor Jorgen Eriksen.

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