

Nitrogen efficiency increased with separate sulphur application

Growers choosing to cut back on secondary nutrients in favour of straight nitrogen (N) applications this spring shouldn't forget that doing so could mean that some of the expensive N is left unused by the crop.

As fertiliser prices remain high, the increased outlay will prompt some growers into scaling back on sulphur and trace nutrients in favour of additional kilos of straight nitrogen. While this may seem like a financially better move in the short term, it will contribute to nitrogen use efficiency being reduced and a fall in soil nutrition.

If nitrogen crop requirements have already been purchased as a straight then adding extra expense on an N:S product doesn't make sense, but as Tom Oates, nutrition agronomist at Origin Fertilisers, explains, there are ways around this as Polysulphate can still provide the crop with its sulphur requirement.

“High fertiliser prices are making growers question all parts of their nutrition strategy, and rightly so. However, making these decisions based on fertiliser prices alone doesn't account for the individual nutrient requirements of the soil and crop. Sulphur is essential for protein formation and has a direct relationship to improving crop quality, and its role in nitrogen use efficiency (NUE) can't be underestimated.”

Sulphur and nitrogen relationship

The importance of sulphur in maintaining and increasing nitrogen use efficiency should be of paramount importance, as a recent winter wheat trial in Yorkshire has highlighted. It tested how a blend of CAN (calcium ammonium nitrate) with Polysulphate replaced a straight nitrogen sulphur compound as the first dressing. The Polysulphate added slow-release sulphur, along with potash, calcium and magnesium, with the end result returning an increased yield by 2.8% on the Polysulphate area.

Other key improvements included an increase in NUE of 3.5%, grain protein rose by 2.3%, with a 2:1 return on investment before accounting for the increased soil nutrient build-up.

“Crops with high nitrogen requirement tend to have increased demand for sulphur as it helps plants use nitrogen more effectively. For most cereals and grass, farmers should be looking to apply 12kg of N to 1kg of S to maximise nitrogen uptake and crop performance, and 6kg of N to 1kg of S for OSR and other brassicas,” adds Mr Oates.

Testing to determine requirements

Polysulphate allows growers to maintain sulphur levels in the soil whilst not investing in any extra nitrogen. Sulphur is easily taken up by the plant, but, due to its mobility in the soil, it is prone to leaching and therefore minimal sulphur reserves are held in the soil from year to year, which makes regular applications essential.

Growers using Polysulphate, as opposed to ammonium sulphate, will also benefit from a prolonged release pattern, which means an application in early spring can provide the crop with its entire requirement, meaning growers won't need to top-up later in the season, as Mr Oates explains.

“The sulphur in straight ammonium sulphate is released over a short period of time so is vulnerable to leaching if there is heavy rainfall following application. Polysulphate has a slow

release over 55 days, so there is a much lower leaching risk, and more sulphur is likely to be taken up by the crop.”

The way sulphur moves within the soil depends on your soil type, which means different soils will hold sulphur in different ways. “Sulphur’s negative charge presents issues for a variety of soils. As it is very mobile it is prone to leaching in light, sandy soils and the negatively charged surface of clay particles mean sulphur can’t bind to these soils,” says Mr Oates.

Using a detailed soil analysis, a FACTS trained advisor can highlight the nutrients that are deficient and able to be corrected through prescription nutrition. Soil and crop data can also be used to influence the sulphur requirements for the upcoming season.

Spotting a sulphur deficiency

As the trial highlighted, Polysulphate has the analysis 48%SO₃, 14% K₂O, 17%CaO, 6%MgO, so also supplies a small amount of readily available potassium, magnesium and calcium to growing crops. “This will be useful to growers who have prioritised straight nitrogen over trace nutrients.”

Growers that haven’t applied sulphur directly to the crops and have spotted a sulphur deficiency during the growing period – such as a pale green yellowing of younger leaves, or pale oilseed rape flowers – can identify sulphur concentration in the plant by tissue testing mid-season. These results can be compared against optimum levels to determine if an application is worthwhile to influence crop health.

“Applying 100kg/ha of Polysulphate would supply 48kg of sulphur (as SO₃) to the growing crop over the course of the season, which is enough for most cereal crops according to RB209. Average sulphur applications tend to be at the upper end of RB209 recommendations or higher,” adds Mr Oates.

Ensuring a crops sulphur requirements are met this year will mean growers may need to adjust their fertiliser plans from previous seasons, but by understanding where the nutrition is required, growers can offer crops the best chance of reaching their potential through targeted nutrition.