

IN FIELD FOCUS

— AGRONOMY THAT DELIVERS —



DRILLING DOWN TO NITROGEN SAVINGS

With continued high fertiliser costs, the hunt for alternatives to bagged nitrogen continues. So what can be done?

Working with his ProCam agronomist Ian Jackson (pictured), Cambridgeshire grower Matt Murfitt shaved over £17,000 off his 120 hectare winter cereal fertiliser bill last season. Moreover, his yields went up.

It all came about after giving his cereals an early boost of a special bacterial treatment, and then replacing some of the farm's regular granular nitrogen (N) with a little-and-often programme of foliar N.

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PROCAM

Drilling down to nitrogen savings

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A third generation farmer at Willow Drove Farm, Littleport, just north of Ely, Matt Murfitt farms a total of 194 ha with his father, Danny Murfitt. Cropping on their fenland soil comprises winter wheat, winter barley, sugar beet and spring beans.

"Bagged nitrogen prices had gone through the roof last autumn, so we were looking for alternatives," Matt explains. "I was chatting with my father and we thought, if we end up producing less yield but it costs less to grow, will we be just as well off?"

Against this background, the decision was taken to press on with their usual first dose of 200 kg/ha of granular 24%N + 15%SO₃ in winter wheat and barley in late February. However, rather than follow this with further granular applications, after consulting with ProCam's Ian Jackson, the rest of the season was switched into a single application of the plant growth promoting rhizobacteria treatment, SR3, followed by repeat applications of the foliar N treatment, Efficient N.

First dose

"We applied the first dose of granular N+S because our crops need sulphur when they start growing," Matt continues. "Normally we follow this with another granular application on wheat and barley in mid to late-April, then a foliar N mixed in with the flag leaf fungicide if needed."

"However, around January we were talking with Ian and he mentioned the bacterial treatment and Efficient N. So we thought, why not give it a try?"

"We felt optimistic because we've got fairly fertile land. As it turned out, it was also a dry spring, so I felt more confident with foliar N. The granular wouldn't have been washed into the ground."



The aim of the Efficient N was to keep feeding the crops little-and-often through the season directly into the foliage, says Ian Jackson

Beneficial bacteria

SR3 contains a blend of beneficial bacteria, says Ian Jackson, including those that fix N. "Sprayed onto the soil, the aim was to improve rootzone health and the availability and take-up of nutrients," Ian explains. "SR3 is also claimed to aid phosphate (P) solubilisation. This was important last season because the drought was affecting P availability from the soil."

"Following this, the aim of the Efficient N was to keep feeding the crops through the season, by delivering little-and-often doses of N directly into the foliage. The treatment is designed to provide both quick and slower delivery of N, rather than a single release."

The SR3 was applied in April to both the wheat and barley. Efficient N was applied at individual doses of 2-4 l/ha, either as a solo treatment or tank-mixed with T1, T2 and T3 sprays - with the wheat and barley receiving a total of 16 and 12 l/ha respectively.

Cost saving

Cost-wise, Matt calculates that compared to the £22,500 he would have needed to spend on granular N, plus an additional

£5,200 on foliar nitrogen, the saving made by using Efficient N was £17,500.

Come harvest, yields from both crops also exceeded the farm's average - with the wheat delivering 10 t/ha, compared with 9.3 t/ha average, and the barley producing 8 t/ha, compared with a more typical 6.8 t/ha.

Matt says: "I'm very satisfied with the yield versus the cost. I think we would have been substantially worse off applying granular in 2022. I believe it's the combined bacterial product plus Efficient N package."

"Going forward I'm convinced about foliar N, especially later in the season because it goes straight into the plant. The protein in the wheat was 10-11%, suggesting the N was a bit low, so next time there's probably scope to apply a bit more."

Although this is only one year's results, Matt is thinking of trying a similar approach again - beginning with the bagged N+S treatment, then following up with SR3 but using the Efficient N at a higher dose. This is being integrated with other steps to improve general soil health.

"We're looking more at soil fertility and soil structure," says Matt. "In 2022 it was our second year of growing cover crops, which will be ploughed in before planting the sugar beet and spring beans. The cover crops have also been grazed by sheep."



Cambridgeshire grower Matt Murfitt saw increased wheat and barley yields and saved money after replacing some of his granular nitrogen with an alternative strategy last season



Don't skimp on early N application with winter barley, urges Mike Thornton; you need to encourage primary tillers to produce bigger ears and bolder grains

Regional Experience

If looking to reduce granular N use, be sure to approach it strategically, stresses ProCam head of crop production, Mike Thornton.

"Make sure you know what nutrients are available to the plant from the soil, using soil testing, then devise a nutrient plan. Working with an agronomist means you can also gain experience from other situations.

"We're conducting extra trials looking at how much bagged N can be replaced with alternative N sources," says Mike. "But one crop where the early N application should not be compromised or delayed is winter barley. If you do, you risk losing tillers, and winter barley is sink limited. You need to encourage primary tillers to produce bigger ears and bolder grains."



Oilseed rape is one crop that provides scope to trim back nitrogen if you have built a big enough canopy, says Paul Gruber

With winter barley normally grown as a second cereal, soil N levels are likely to be lower anyway, says Mike, and the early N timing also helps to build more competitive crops against grass weeds. "This is particularly important this season because the dry autumn hindered uptake of residual herbicides," he adds.

Individual fields

ProCam southern region technical manager, Paul Gruber, agrees, and stresses that each field and crop needs judging individually – both in terms of how much



ProCam's trials programme has been further expanded to look at alternative nitrogen sources

total N should be applied, but also how much could come from alternative sources.

Paul says: "The lesson is to use granular N to build an appropriately-sized green leaf area canopy first. Once you've built green leaf area, you then have flexibility to apply foliar N because you've established

a spray target. Don't use foliar N early. Build the canopy first. With oilseed rape, there is scope to trim back N if you have a big canopy," he adds.

In the North, regional technical manager, Nigel Scott, points to three example scenarios for using alternative N sources, such as foliar N:

- Where it has not been possible to buy any granular N, leaving no option but to look at alternatives.
- Where some granular N has been purchased but not enough, creating a need to top up with an alternative.
- Where enough granular N has been purchased, but growers are looking to capitalise on grain price by pushing yield, so want an extra boost.

"With the price of bagged N, alternatives such as foliar N, as well as sources such as slurry and digestate, have become more important," says Nigel. "But you've got to know which nutrients these are supplying and how much, and how best to apply them. And you've got to know what nutrients are available to the plant from the soil.

"With slurry, there is also often phosphate, potash and sulphur in there as well as nitrogen. Sulphur is useful because it helps the plant take up N.

"Historically, slurry and manures have been viewed as waste products. But we've got to get out of this mindset and factor them into nutrient plans."



Image courtesy of Tramspread

Slurry can supply phosphate, potash and sulphur as well as nitrogen, says Nigel Scott

Stimulating advice for spring barley

Good demand as Scottish malting capacity increases, coupled with relatively low growing costs, mean there is a lot to play for with spring malting barley.

That is the message to Scottish growers from Alistair Gordon, regional technical manager for ProCam's Turriff-based and Invergordon-based Robertson Crop Services division.

"With decent spring barley yields of around 7.5 t/ha now regularly achieved in our area, and the crop's nitrogen fertiliser requirement running at about half that of winter wheat, spring barley offers good financial potential," says Alistair.

"However, with bigger weather events now increasingly common – including deluges but also dry periods where rainfall can't be guaranteed when needed – setting up spring barley crops so they produce well-developed root structures has become much more important.

"Without good root structures, there is a bigger risk that spring barley, which is a delicate crop to begin with, will suffer drought stress and a yield impact if it turns dry. Also, stressed crops are more susceptible to Ramularia.

"Good seedbeds are clearly the starting point to aid rooting – we don't want a seedbed that's too compacted for roots to penetrate or too rough for rapid crop establishment. But another technique that's really gaining momentum is

proactively feeding spring barley early with a biostimulant which combines a seaweed extract plus trace elements."

By using this approach in 2022 to build root structures early, Alistair says he is convinced that, by the time the dry weather arrived last season, treated crops were already more robust and so better able to tolerate the conditions.

Alternatively, where spring barley crops are thin and need

a tillering boost, he says he has seen success with a different biostimulant – Zodiac.

"Last season was the first time we've used Zodiac widely on-farm, having previously evaluated it in trials. But I've been impressed with the results. I've seen it more than double the number of tillers on a thin spring barley crop from three to seven per plant.

"It's probably fair to say that biostimulants used to be treated with some scepticism. But there's a lot more trial work behind them now, and we do our own testing. It's also important to choose the appropriate biostimulant for the job.

"It's true that biostimulants are an extra input. But if crop investments are trimmed back excessively and yields suffer due to unforeseen weather events, all you do is run the risk of increasing your cost of production per tonne."

Cover crop conclusion

As well as using a biostimulant to get the most from spring barley, preceding the crop with an overwinter cover crop can boost spring barley yield as much as 0.5 t/ha, Alistair Gordon has found.

In addition, because cover crops suck winter moisture from the soil, he says they can also make the ground easier to cultivate.

"As with biostimulants, it's important to choose the correct cover crop for the situation. If you grow oilseed rape, for example, you don't want a cover crop that contains brassicas because of concerns about brassica volunteers transmitting clubroot through the rotation."



A technique that is gaining momentum is proactively feeding crops early with a biostimulant, says Alistair Gordon

With 'big weather events' – from deluges to dry periods – increasingly common, setting up spring barley crops to produce well-developed root structures has become much more important, says Alistair Gordon

Reboot weed burdened crops

Heightened weed burden could mean growers need to contemplate replacing heavily inundated crops.

As a result of last summer's prolonged drought, some early-drilled winter wheats are facing a heightened weed burden after the dry conditions prevented pre-emergence herbicides from working effectively. That's according to Mike Thornton, ProCam's head of crop production, who urges growers to assess the worst affected fields to determine if the current crop should be retained or sprayed off and re-drilled.

"Despite being a distant memory, the summer's dry and hot conditions are still having an effect on the new cycle of cereal crops," Mike explains. "Some wheats which were drilled ahead of schedule or on lighter land suffered from a lack of soil moisture, which prevented soil-acting pre-emergence herbicides from working to the best of their ability. As a result, some winter cereals are currently facing

heightened competition from out-of-control weeds which, in the most severe cases, could threaten the crop's viability and profitability."

Mike therefore recommends that each field should be assessed on a case-by-case basis to decide if the current crop, or part of it, should be sprayed off and re-drilled with a spring crop.

"Where the weed burden is excessive or contains difficult-to-control competitors such as black-grass, ryegrass and brome, it could be quite an easy decision to make. For example, if grass weeds have made it to the two-leaf stage or beyond, they will be very difficult to control as most contact herbicides have been rendered ineffective by mounting resistance.

"In the most severe cases, it will make sense to admit defeat sooner rather than later and to

write-off the current crop so that weeds can be burned off ahead of a replacement crop being established.

"However, growers should be aware of the restrictions imposed by certain active ingredients on replacement crops. The best approach is to seek definitive advice from your agronomist and, where necessary, to implement a 'plan B' sooner rather than later."



Mike Thornton urges growers to check crops on a field-by-field basis to assess weed burdens.



Biological pest control for brassicas

The anticipated revocation of a key pesticide active ingredient means veg growers will need to find alternative ways to control caterpillars in brassicas.

The final use-up date for indoxacarb (commonly applied as Rumo or Steward) is expected to come into force within the current cropping year, and potentially as soon as July 2023. This translaminar pesticide, which kills caterpillars as soon as treated leaf material is ingested, will be missed by many brassica growers, especially as no alternatives are currently available or on the horizon.

The situation is exacerbated by the widening resistance to pyrethroid based insecticides which are coming under significant registration and renewal pressure. "With fewer actives to call upon,

brassica growers will need to find alternative products and implement new strategies to ensure crops remain properly protected," explains vegetable and salad crop agronomy specialist, Ashley Cooley.

"A couple of years ago, crops in the east of the UK were inundated by an influx of Diamondback moths (*Plutella xylostella*) which blew in from the continent, with many growers finding out the hard way that this species, like many others, is now resistant to the current arsenal of pyrethroid pesticides.

"The lesson learned during that season was that it is no longer feasible to rely on what have been relatively cheap chemical control measures. Instead, we must adopt an integrated approach to pest management and use novel biological products to substitute the 'traditional' armoury."

In a changing environment where the focus has rightly shifted towards protecting beneficial insects, brassica growers will need to use biological products such as Sentinel (which contains silicon +10% salicylic acid to toughen leaf and root cells and kill insects by dehydration) to produce healthy, resilient crops which can withstand the damage caused by sucking and biting pests.

"Products such as these have a superior environmental profile compared to the more



Brassica growers will increasingly need to use biological products to safeguard crops from pest damage

traditional range of insecticides, and, when used correctly can be just as effective at controlling pest populations," Ashley continues.

"However, their persistence is limited which makes the timing and accuracy of application essential, with a water volume of at least 250 litres/ha (and ideally up to 400 l/ha) required to ensure full coverage is achieved.

"As the industry loses more active ingredients our mindsets and methods of farming must change. And as agronomists we need to ensure new products and crop protection strategies are implemented effectively to ensure crops remain protected and viable."



Biological products can deliver effective insect control according to Ashley Cooley

Weapons of crop destruction

Cover crops are rapidly becoming a core element of many arable rotations thanks to their ability to retain and even augment soil nutrients, improve soil structure, and enhance the scope and diversity of soil biology. But to maximise their benefits, cover crops need careful management, not just at establishment, but also at the point of their destruction. ProCam's Hall Charlton shares his thoughts on how and when they should be destroyed.

The benefits provided by establishing a cover crop in-between commercial crops are influenced not only by the species of cover crop being grown, but also on the timing and method with which they are removed.

Careful consideration must therefore be given to determine if the cover crop should be removed by chemical, mechanical or grazing means, or via a combined approach, with the following cash crop also influencing how best to destroy the cover crop.

Chemical destruction

The removal of cover crops by means of chemical activity is dominated by the use of glyphosate which provides the added benefit of controlling difficult grass weeds such as black-grass and ryegrass.

Rate, timing of application and completeness of coverage are essential for glyphosate to work properly: an appropriate spray nozzle which delivers full coverage of thicker canopies should be used, with a high enough water volume needed to ensure effective penetration into the lower canopy.

While brassicas and legumes will require a full rate dose of

glyphosate to ensure total kill-off – and may take up to 4-6 weeks to die – easier to control cover crops can be destroyed using a lower rate of the active ingredient. The exact rate and speed of destruction will depend on the formulation of glyphosate being used, with premium formulations working faster than older preparations which can be slower acting, particularly at lower temperatures.

In some situations, a secondary active might prove useful, but be careful regarding subsequent cropping restrictions, and if in doubt, speak to your agronomist to ensure the proposed tank mix is safe for the following crop.

Grazing

As the cost of glyphosate has risen in recent years, so too has the popularity of grazing as a means of eradicating cover crops, especially as it offers the added benefits of recycling nutrients and generating a secondary income. It is worth remembering however that not all cover crops or soil types will lend themselves to grazing, with heavier soils susceptible to poaching if grazed too heavily during wet conditions.

As part of an integrated approach, cover crops should be grazed relatively lightly to remove the majority of the crop's biomass before spraying off a week or two later once some leaf regrowth has occurred.

Frosts, rolling, flailing and ploughing

Species such as buckwheat, berseem clover and mustard will die off naturally in frosty conditions, while winter-hardy species such as vetch, cereals, linseed and radish will be more tolerant to cold

weather and will therefore require additional management.

Rolling with a plain or crimper roller during a heavy frost will enhance the destruction of cover crops by breaking frost-hardened stems at the growing point with any remaining plants easily sprayed-off using a reduced rate of glyphosate.

For heavier crops with woody stems which can't be grazed, flailing will ensure good crop destruction, while ploughing or deep cultivation and inversion is popular ahead of root crops such as sugar and fodder beet or potatoes.

Destruction dates

The date for cover crop destruction will largely depend on when the following cash crop is scheduled to be drilled. However, if the cover crop has been included as part of an environmental scheme, the specific date of destruction may need to be revised. Either way, it is important to ensure there is enough time between destruction and drilling for the cover crop (and any weeds) to be fully broken down.



Cover crops can be removed by chemical, mechanical or grazing means



Care is needed when removing cover crops advises Hall Charlton

In recognition of long service

Two key members of ProCam's Scottish agronomy team have recently celebrated a combined 69 years of service with Robertson Crop Services.

Richard Allan, who retired at the end of the year, joined Robertson Crop Services 38 years ago when he was taken on as an agronomist and agrochemical specialist to extend the company's area of operations eastwards into Aberdeenshire.

Since he joined the company in January 1985, Richard's management credentials, and expertise in spring barley, oilseed rape, winter barley, winter wheat and potato agronomy, have helped Robertson Crop Services to grow, with Richard also playing a key role in the formation of the company's agrochemicals subsidiary, Robertson Agrochemicals (Grampians) Ltd.

Richard was also integral to ProCam's successful acquisition of Robertson Crop Services in 1995, and for the last 10 years has

steadfastly overseen the continued success of Robertson Crop Services as managing director.

During his career, Richard has worked closely with Ron Paterson who joined the Robertson Crop Services team 31 years ago. Ron's career in the agricultural industry began when he joined Elbar from college – initially selling farm machinery before progressing to an agronomy role. He subsequently spent nine years working for Kenneth Wilson in Fraserburgh, before joining the Robertson team in August 1991. Ron continues to play a significant role within Robertson's Cuminstown depot, working closely with growers throughout Aberdeenshire.

Commenting on Richard and Ron's milestone achievements, Diane Heath, managing director

of ProCam UK commented: "On behalf of everyone at ProCam UK and beyond, I'd like to take this opportunity to formally congratulate and thank both Richard and Ron for their long and successful careers with Robertson Crop Services. Their knowledge, commitment and enthusiasm for the sector have made them invaluable members of ProCam's Scottish team over many years."



Richard (left) and Ron received long service awards from The Royal Highland and Agricultural Society of Scotland

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