

IN FIELD FOCUS

— AGRONOMY THAT DELIVERS —

REGIONAL PLANNING TO GET CROPS ON TRACK

After the wet autumn brought havoc to winter crops in many regions, how does agronomy need adapting? ProCam agronomists around the country offer guidance.

With only 25% of winter wheat and barley drilled in North West England, and some crops borderline whether they are worth keeping, some critical field-by-field decisions will be needed in early 2024, says agronomist, Tom Smith.

“Many people are hopeful of drilling more winter wheat up until the end of February [variety dependent], which can pay better than a spring crop here in my opinion. But don’t force later-planted wheat in. Get the seedbed right. And don’t rush in too soon with pre-em herbicides,” he adds.

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A phosphite or seaweed based biostimulant to aid rooting and tiller manipulation could be a wise decision on backward cereals, believes Lancashire's Tom Smith



With winter cereal roots not needing to reach down for moisture, a foliar phosphite to aid rooting will be a first port of call for Jim Nutting

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North West England

Getting early phosphate and nitrogen (N) on once allowable will be important for tillering of backward winter cereals, Tom Smith continues, but not too much while leaching risks remain high. "Maybe 50-60 kg N/ha for the first application, followed by a normal programme. The key is understanding when the crop is waking up from winter, which is down to soil temperature.

"A phosphite or seaweed based biostimulant for rooting and tiller manipulation is also worth considering. Not many people have applied herbicides – so assess weed situations, such as brome and ryegrass, and apply once temperatures are appropriate."

East Anglia

With most winter oilseed rape (WOSR) and winter barley planted, but only 60% of the winter wheat area in, remedial action is needed, says Eastern counties agronomist, Drummond Scrase.



While some East Anglian growers will continue drilling winter wheat if conditions allow, others have already decided to revert to spring wheat or spring barley, says Drummond Scrase

"Most WOSR established well, particularly hybrids, and propyzamide and fungicide applications are now planned.

"For cereals, although drilling opportunities were more forthcoming where deeper cultivations were used, shallow cultivations left wetter conditions and poorer establishment, and delayed wheat planting has resulted in slow growth.

"Winter cereals that are established will be candidates for BYDV treatment once crops reach 170 day degrees, partnered with manganese and a top-up herbicide field-by-field. Crops that haven't received herbicide are a priority for a contact/residual mix before weeds get too large.

"Sulphur (S) requirements will also need addressing – either in spring or with winter applications of Brimstone – because much will have been leached. And early N will be essential on less-developed crops to encourage tillers, followed with a low dose PGR to promote rooting and tillering."

East Midlands and Yorkshire

With only 20% of winter cereals drilled and only 50% of WOSR surviving, Jim Nutting, who operates in Nottinghamshire, Lincolnshire, and South Yorkshire, predicts a surge in spring cropping, unless a very kind January allows more winter wheat planting. "Soils are saturated. Since 21 September, 226mm of rain fell in just six weeks."

To boost flagging winter cereals, Jim advocates nitrogen in February, if possible, although only 40 kg/ha because of leaching risk. With roots likely to be poorly developed, foliar phosphite will also be on his agenda. "Roots

haven't had to push down for moisture. A lot of crops also haven't received herbicides, so grass and broad-leaved weeds will need attention."

Only about half the region's WOSR survived cabbage stem flea beetle, adds Jim, and some of that has started rotting in waterlogged fields. "We will only decide what to do with the crop when, or indeed if, it wakes up in the spring.

"Spring barley already features in many rotations, so most growers have experience of growing this, but there could be quite a bit drilled on strong land, and it must go into good seedbeds. If you drill too early and make a mess, it won't thrive. That said, we target 7.5 t/ha from spring barley on good land and, with a potential malting premium, margins can be good. The other option on kinder land is maize for AD."

Oxfordshire

Extreme variations in crop growth means fields will need managing on a case-by-case basis, says southern regional technical manager, Paul Gruber. 'Feeding' smaller crops to 'nurse' early spring growth will be among the priorities, he notes.

"About 20% of the winter wheat was drilled early in good conditions and looks normal; 60% was drilled but hit hard by the weather, with some having not received any herbicide; and 20% remains unplanted.

"Residual N in the soil could be low after the deluges. So applying N suitably early will be key in backward crops – as will tailoring other macronutrients plus micronutrients. With many crops poorly rooted, we'll also be looking to a suitable biostimulant once



We don't know how future weather will impact on crop growth – some crops could bounce back, says Paul Gruber, so fields will need managing on a case-by-case basis

there's active growth.”

By comparison, Paul says some early-drilled WOSR is huge, so could be a target for trimming back early N inputs, while backward or thin WOSR will need nutrition adjusted to boost green area index (GAI).

South East England

Despite plenty of rain, South East England has been relatively lucky, believes regional technical manager, Justin Smith, and in many fields it's a case of protecting crop potential.

“WOSR looks promising, and we'll be monitoring GAI and planning initial N fertiliser accordingly. Early sulphur (S) will also play an important role. S helps not only mobilise and utilise N more efficiently but is also beneficial in the plant's chlorophyll production. Micronutrients such as boron, molybdenum and magnesium are also likely to be included with an early stem extension fungicide for disease control and canopy management.”

Most winter wheat and barley has received a pre-em herbicide, says Justin, and at least one aphicide, as conditions and early drillings continue to favour rapid multiplication. “First N and S applications will be on a field-by-field basis. Some thick cereals may



With some forward canopies, Justin Smith has already been finding rust in oats (pictured) and winter wheat

need reigning back.

“I'm already finding yellow rust in winter wheat and crown rust in oats. Where it's a problem, I will be looking at a robust TO fungicide, likely based on triazole chemistry. I can also foresee lots more need for early PGR to encourage rooting and stem wall thickening. Biostimulants can also play a useful role in stimulating early rooting and in helping maintain tillers and alleviating stress. Recent spring droughts have seen crops on poorer soils losing tillers, especially where they have underdeveloped root systems and backward growth because of earlier waterlogging. In these instances, an early biostimulant can be advantageous.”

Western counties

Good progress with planting WOSR and winter barley has contrasted sharply with variable winter wheat progress across Herefordshire, Shropshire and into Wales, says agronomist, Harry James, and many winter cereals did not receive autumn sprays.

“Most of the WOSR that has been planted and has survived cabbage stem flea beetle has had propyzamide and autumn fungicides, together with boron which is important for flowering and acts as an ‘anti-freeze’.

“Winter barley is also generally looking well. But while 90% of winter wheat has been drilled and most looks good, some later crops in wet fields are patchy and decisions will need taking whether parts of fields need replacing.

“A lot of winter cereals also haven't received BYDV sprays. Hopefully frosts will reduce pressure, but preventative sprays may be relevant. A lot of wheat hasn't received herbicides, so large weeds in early-drilled crops are likely to need contact materials. Later crops could still be an option for residual herbicides, with slower weed growth.

“For thin wheat, N applications might need bringing forward to boost tillering, starting with a low dose in February, and followed by a dose of PGR in early March to do the same. With potentially less soil N available after the wet autumn, residual N will need assessing before N applications start.”



A dose of PGR in early March to aid tillering may be useful in thin winter wheat, says Harry James

Aberdeenshire

With wet autumns familiar in Scotland, most winter crops were drilled in good time, says agronomist, Phil Smith, but deluges have had other effects.

“We had 160-170% of our normal rainfall in October,” says Phil, “so autumn herbicides, such as propyzamide, and light leaf spot sprays weren't applied in WOSR. They'll need doing at the first opportunity before 31 January.

“The deluges will have also washed away water-soluble soil nutrients. Any excess N will be gone, P will be locked up, and K will be down. S and boron are also water soluble. Application of water-soluble trace elements to redress the balance will need to be front of mind across winter crops as soon as they wake up in spring.

“Normally in winter barley these are applied with a TO fungicide and PGR, but they might need applying earlier. The extra growth of forward crops could mean their nutrient reserves are diluted. I'll be looking to apply 25-30% of the total N dose for the season to winter barley as soon as permitted.

“Most winter wheat was also planted okay and looks fine. It's generally more resilient than barley, but nutrients still need monitoring after the washout weather.”



With water-soluble soil nutrients likely to have been washed away, applying boron to WOSR at the earliest opportunity is a key consideration, says Phil Smith

Nitrogen efficiency solutions on trial

With other reasons, besides cost, for incorporating alternatives to bagged nitrogen into fertiliser programmes, ProCam trials have put a number of options to the test.

Granular nitrogen (N) prices may have fallen back from their 2021/22 highs, but the aftershock has left a legacy of farmers wanting to use N more efficiently, believes ProCam technical development manager, Rob Adamson. And for good reasons.

“We live in volatile times,” says Rob, “so who’s to say we won’t have another surge in bagged N price. Plus, there are other reasons for looking at more efficient N use and alternative N treatments.

“The first is an insurance for where granular N uptake is compromised – for example in dry soils or crops poorly rooted after a wet winter. Another reason is sustainability and the carbon footprint of traditional N fertiliser.

“It makes sense to not only ensure the traditional N that’s applied works efficiently, but also to use alternatives to support conventional fertiliser where feasible. If end markets want lower carbon footprint produce, these types of solutions may also help towards that goal.”

Initial findings

Initial trial work on bagged N alternatives in winter wheat at ProCam’s flagship research hub at the Stockbridge Technology Centre (STC), Yorkshire, during 2022 yielded encouraging results.

For 2023, the work was extended across the country to investigate how these products might contribute within an N programme. As part of this, a replicated winter wheat trial on-farm in County Durham assessed a range of these alternative N strategies when the farm’s standard 180 kg N/ha programme was reduced. Similar trials were conducted in winter barley at STC and in winter wheat in Cambridgeshire.

“We wanted to see if the treatments could maintain yield if the standard N dose was reduced,” Rob explains. “With the first N dose critical for tiller retention, cutbacks were only made in the second and subsequent doses.

“While the standard 180kg N/ha rate in the County Durham trial yielded 11.35 t/ha, we found that yield fell to 10.9 t/ha when the second and third N inputs were reduced by 25% each to give a total input of 150kg N/ha. Reducing the second and third doses by 50%, to give a total dose of 120kg N/ha, resulted in an even lower yield of 10.66 t/ha. These are major yield reductions, but if the first N dose had been lowered as well, we expect yield would have been impacted much more.”

Potential techniques

Looking at the range of techniques for potentially mitigating reduced traditional N fertiliser use or availability, Rob says there are a number of options. These include: applying products to improve plant uptake of N from the soil through better rooting; applying products to help plants utilise the N they absorb more efficiently; and applying products to provide N to plants in alternative ways.

“The first technique – of improving plant access to soil N through below-ground biomass – is something we have evaluated previously,” he says. “Phosphites and brown seaweed extracts are



ProCam trials in wheat and barley have investigated multiple techniques to improve nitrogen use efficiency, says Rob Adamson

particularly effective. However, it's important to build roots while the crop is in its vegetative growth phase, so these solutions sit early in the programme – applied at T0.

“For the second technique, we know that the efficiency with which N is utilised once inside the plant can be limited by several factors. So we looked at how to respond to this, for example by applying pidolic acid, a compound involved in N metabolism.

“In the County Durham work, we found that Twoxo, which contains pidolic acid and specific metabolites, applied at T1 with the 150kg N/ha programme produced a yield of 11.36 t/ha – which was only 0.11 t/ha less than the yield from the full 180kg N/ha programme. When used with the 120kg N/ha programme, the yield was the same as the non-supplemented 150kg N/ha programme – indicating that, by using Twoxo, 30kg of N could be saved.”

Alternative sources

Looking at the next approach – providing N from other sources – Rob says this included the use of N-fixing bacteria, which take atmospheric N and make it directly available to the plant.

SR3, for example, is a soil-based rhizobacteria, he says, which fixes N around the root zone, and about a 5% yield uplift had previously been seen from using it. In 2023, averaged over hybrid barley, conventional barley and wheat, a similar increase was seen, demonstrating its consistency, he notes.

“We also evaluated other bacteria that work slightly differently – notably the exciting endophyte bacteria, Encera.

“Discovered in sugar cane and developed at Nottingham University, the Encera bacteria have a tail, or flagellum, and can move along the leaf surface and colonise the whole plant, fixing N inside the plant's own cells in a symbiotic relationship. The plant gives the bacteria sugar in return for readily available N.

“Once Encera is in the plant, it moves from leaf to leaf as the plant grows. Having N available directly where needed mitigates the risk of slow N uptake due to dry conditions. This was put to the test in the heat of 2022 when we saw



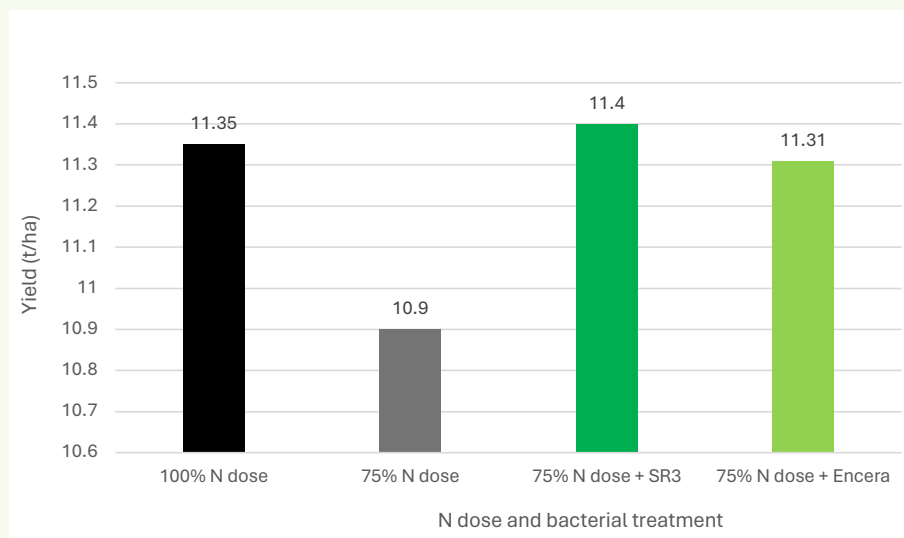
a 7.5% yield improvement from the product in winter wheat at the STC.

“In 2023 at the County Durham site, we also saw a yield benefit in winter wheat when used with the 75% reduced N rate (see chart). In addition, depending on N dose, we also saw between a 6 and 9% yield

improvement in the work at STC in barley.

“Overall, there are multiple reasons for considering these various types of alternative N treatments as part of a wider programme. Work continues in ProCam trials for 2024.”

Trial results show that using N fixing bacteria treatments could help to bridge the gap to maintain yield if the standard N fertiliser dose is reduced



Source: ProCam winter wheat trial, 2023. Reductions in N dose were made only to the second and third applications in the three input programme; first N dose left as a standard 60kg.

Check plant availability of nutrients – SoilSense

The starting point to using any nutrient efficiently is accurate soil testing. Not just testing for the levels of nutrients present in the soil, but the levels actually available to the plant. Ahead of spring

cropping, contact your ProCam agronomist or local ProCam depot to find out how SoilSense – our tailored soil analysis and nutrient planning service – can help. Or e-mail soilsense@procam.co.uk.

Extending maize rotations to elevate crop performance

With sustainable farming payments making cover cropping financially attractive, maize growers are beginning to re-assess how best to manage stubbles after harvest.



Merfyn Parry encourages maize growers to extend the crop rotation on ground used for maize

While it may be tempting to use a basic cover crop to protect bare soils, there are better ways of achieving this, with evidence suggesting that widening the rotation is a superior approach, especially where maize is currently being grown continuously.

Growing consecutive crops of maize can cause a range of problems including degradation of soil structure, depleted microbial and biological activity within the soil, pH imbalance, increased weed pressure, and nutrient losses caused by leaching and run-off.

"It isn't always easy to rotate crops, especially on land located away from the main farm," explains ProCam agronomist Merfyn Parry, "but there are ways growers can boost the benefits of cover cropping beyond simply securing sustainable

farming payments."

Merfyn explains that the minimum growers should be doing is to ensure maize stubbles are covered as soon as possible after harvest.

"If conditions allow, grass can be under-sown into the young maize crop to provide cover before the crop has been harvested. Where this isn't feasible, the next best option is to establish a grass ley as soon as possible after the maize has been cleared. In both scenarios, the cover crop will give growers the option to over-winter livestock and to take an early cut of grass silage before the next crop of maize goes in."

While this basic system should be feasible in most circumstances, Merfyn urges growers to consider an alternative approach, citing a client on Anglesey where energy crops are grown for the island's

anaerobic digestion (AD) plant and maize ground is never left empty over the winter.

"In a normal year, as soon as the maize has been taken, we sow a crop of hybrid rye which is harvested the following June as a second AD energy crop," Merfyn explains. "The wet 2023 season meant we only managed to drill half of the hybrid rye, with the rest going to spring barley instead. The hybrid rye will then be followed by a crop of ryegrass which will be taken as silage and grazed the following winter. Spring barley then goes in and is taken either as wholecrop silage or as a third energy crop. A second crop of ryegrass is then sown and used for over-winter grazing and to take an early cut of silage before the land is finally put back to maize."



Extending the rotation helps to ensure subsequent crops of maize perform as expected

Where possible, each crop is established via min-till to reduce soil damage, minimise carbon losses and reduce establishment costs, with the plough only being used to create a seedbed for barley and maize.

This rotation is only possible because of the local demand for

energy crops, but Merfyn believes a wider rotation is beneficial wherever maize is being grown.

“Extending any rotation can take time, effort and experimentation, but the benefits are worth it,” Merfyn states. “We budget to produce 16 to 17 tonnes per acre, but in 2023 we achieved closer to 21 tonnes at a dry matter of 34%. That’s in part due to the year’s favourable conditions, but the extended rotation also contributed, with the intermediate crops promoting soil health and helping to break the disease cycle so that subsequent maize crops encounter less pressure from fusarium and eye spot.

“In 2023 we grew P7179 which has high natural disease resistance and good standing power to help it withstand Anglesey’s windy conditions. But we can’t rely on the crop’s natural abilities alone to produce a decent crop.

“Instead, we spend a lot of time and effort soil sampling to ensure each crop of maize has access to the right amount of readily available macro- and micro-nutrients, and also take plant tissue samples from all crops to determine if any foliar feeds are required after the crops have established.

“This has taught us that Anglesey’s soils are naturally low in sulphur and that applying too much digestate can result in an excess of phosphate, so we’ve compensated by adapting the estate’s nutrient programme accordingly.”

A similar level of detail is also taken in the fight against wireworms which have the potential to decimate maize in heavily infested fields.

“Wireworms are a real hazard on ground which has been used to grow grass for an extended period, and it’s not unheard of for growers to shy away from rotating their maize ground because of the threat of damage,” Merfyn explains. “But their impact can be reduced by using a break crop between grass and maize.

“Seed dressings can reduce wireworm pressure, but these are becoming less effective, so the better course of action is to extend the rotation. In most scenarios a one or two-year break between grass and maize should give enough time for most populations to be brought under control, but regular soil inspections and the advice of a good agronomist should always be used to ensure any new ground is suitable for maize.”



The maize produced as a feedstock for Anglesey’s AD plant is grown in rotation with hybrid rye, ryegrass and spring barley

Trials focused – did you know?

With trials across the UK, ProCam continues to invest in innovation and research to ensure our agronomists are equipped with the latest data and the best advice to support our customers' success.

ProCam is at the forefront of addressing many of the challenges faced on-farm today, as well as what we envisage in the future. Our development team works alongside our agronomists across the country to ensure

new solutions are rigorously tested, and that we have a complete understanding of the latest innovations. In doing so, our customers are supported with the best advice appropriate to their individual farming system.

A snapshot of key trial locations for 2024

Key:



Fungicide R&D

With an ever evolving landscape of varieties and disease resistance challenges, ProCam has a network of fungicide research stations on a range of crops across the country



Nutrition R&D

With nutrient use efficiency as important as ever, ProCam is researching a range of solutions in a variety of crops to get the best out of crop and soil



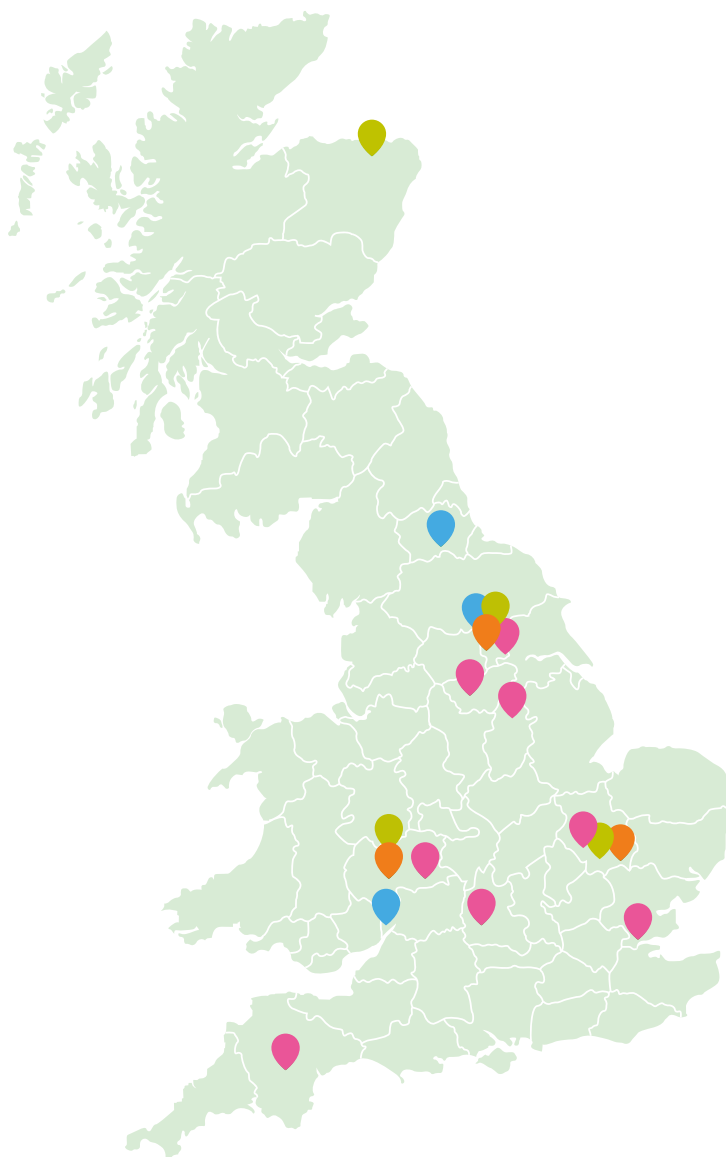
Herbicide R&D

Weed control challenges vary across the country. ProCam uses a range of sites to understand how best to utilise the latest chemistry and implement successful programmes and strategies



ProCam Regional Demonstration Platforms

An opportunity for our customers to see the latest innovations within ProCam and learn more about our solutions based approach to agronomy



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