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September 2026

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“We can’t keep pumping our future out to sea”



POINT OF VIEW

Growing up on a farm named after its natural spring (Springwell), I took for granted that the water nourishing the land came from a seemingly endless underground supply. Today I represent farmers in the Fens, a landscape built by centuries of drainage engineering designed to create England’s most productive arable soil.

Every winter we watch good water pumped off the land and out to sea; then every dry spring brings the pain of filling in forms to abstract a fraction of it back. That paradox captures a wider problem for UK arable farmers and one which is set across a backdrop of record drought and a painfully dry harvest.

We occupy a landscape built to remove water, yet farmers are short of it exactly when the need arises for irrigation. Internal drainage boards keep fields from flooding, but nobody designed the system for summer storage, leaving a patchwork of ad hoc, wasteful solutions. Meanwhile, water companies press ahead with large-scale reservoirs to secure household supply, and rightly so.

But the contrast in treatment is stark: a utility company can push on planning and regulatory processes with money and political weight, while a farmer wanting a modest on-farm reservoir faces years of planning wrangles, environmental assessment and abstraction licensing, all at considerable cost.

If government placed food production higher on the agenda, this red tape would soon be cut. Grants like the Farming Investment Fund’s Water Management Grant are welcome but only go so far, while the regulatory pathway remains slow, expensive and uncertain.

It’s a theme HCR Law explored in its in-depth report, *Food For Thought: Shaping Sustainable Farming Futures*, in which we make the case for farmers being free to innovate and make the most of their assets.

Where a reservoir has spare capacity, there’s an opportunity to supply surplus water to neighbouring farms, local businesses or even water companies, turning a costly asset into an income stream. At present, licensing and environmental issues make such arrangements commercially

awkward. A lighter-touch approach to third-party supply and reuse could transform the economics of on-farm reservoirs for farm businesses.

The Environment Agency has a crucial role here – reforming abstraction licensing for agriculture is long overdue. Farmers aren’t asking for a free-for-all, but for a proportionate approach that recognises them as responsible local stewards of water, with every incentive to look after it.

I accept there’s a genuine tension between reserving water for nature and for people; nobody wants dried-out rivers or damaged wetlands. But farming is the bedrock of society and farmers, who understand their catchments intimately, are often best placed to manage water locally.

If the UK is serious about long-term food security, more must be done such as greater funding for on-farm irrigation, a streamlined consenting process and an Environment Agency that treats farmers as partners rather than applicants. We can’t keep pumping our future out to sea.

By Emily Pumprey, partner in HCR Law’s agricultural and rural property team in Cambridge.



**CROP PRODUCTION MAGAZINE –
FOR FARMERS AND THEIR AGRONOMISTS**



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The new crop on the block
promising to deliver the goods
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CROP PRODUCTION MAGAZINE

September 2026
Volume 28 No 8



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About Crop Production Magazine

Crop Production Magazine is the leading specialist journal for UK arable farmers and agronomists.

The magazine operates within a controlled circulation with a readership including farm managers, agronomists, machinery dealers and other arable supply industry professionals.

CPM is also distributed to agricultural universities, colleges and research institutes, examined by some of the leading researchers in their field as well as the next generation of crop specialists.

Above all, the magazine is read by UK farm business owners – decision makers. Articles are mostly in-depth and analytical, exploring the issues behind a current

problem while aiming to present new ways of thinking.

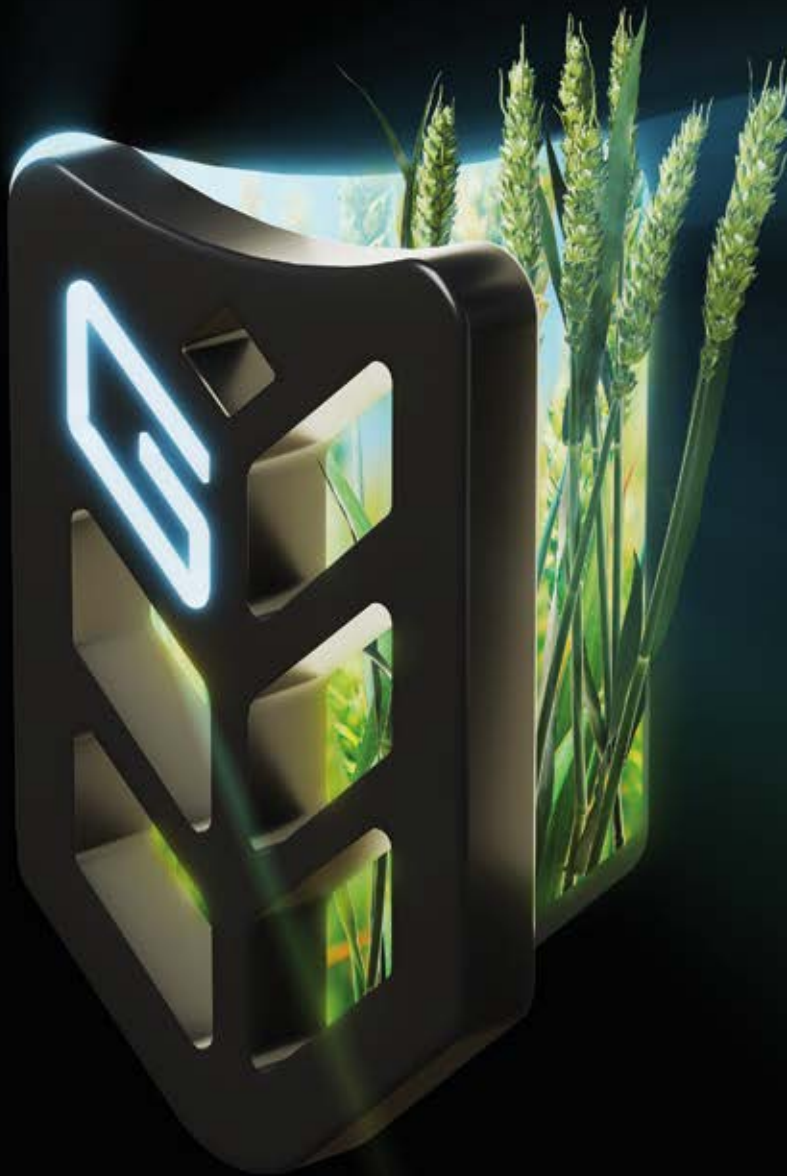
The magazine doesn't seek to prescribe solutions, rather inspire, stimulate and inform.

CPM is proud to represent some of the most experienced agronomic, technical and machinery journalists, many of whom have received British Guild of Agricultural Journalist awards for their contributions.

The team works closely with companies that support CPM to gather inside knowledge on the technical issues that affect farmers and the wider food chain. Although small, CPM is managed by a driven team, responsible for delivering the sharpest insight and most relevant information across both print and digital formats.



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Everything changes, or does it?



“By working at multiple sites of action it makes resistance harder to evolve, which may explain why after 60 years, tri-allate hasn’t failed.”

DR DANA MACGREGOR

With autumn comes an urgency to talk all things grassweed control. *CPM* reports on some of the latest research and advice to bolster existing knowledge about this pivotal aspect of cereal crop management.

By Janine Adamson and Rob Jones

For some, it may feel like there’s little new to report on how to manage grassweeds in cereal crops. And while on the face of it, the fundamentals indeed remain the same, nuances about how best to use certain products and processes are continuing to come to light.

For one, work has been taking place by Rothamsted Research to better understand the role of Avadex (tri-allate) and its mode of action. This was

initiated after the Herbicide Resistance Action Committee (HRAC) placed tri-allate in Group 15 alongside flufenacet, prosulfocarb and ethofumesate, as part of a classification overhaul in 2020.

Naturally, this has raised questions whether these active ingredients should be used together in herbicide programmes, given increasing concerns regarding resistance management. However, while Group 15 herbicides are based on

physiological action – whereby they inhibit very long chain fatty acid synthesis – Avadex manufacturer Gowan believed there were differences between the Group 15 molecules.

“We required clarity to understand if they shouldn’t be used together anymore,” says global herbicide asset manager for Gowan, Laurent Cornette.

To undertake this critical work, Rothamsted Research’s Dr Dana MacGregor conducted initial experiments in a controlled environment to compare the effects of flufenacet, tri-allate and a third active, EPTC (not registered in the UK) on blackgrass development. Critically, it found that tri-allate and EPTC impacted shoot growth in contrast with flufenacet, that altered both root and shoot growth. ►

► “Following application, the plant grows in a different way – its biology is impacted,” highlights Dana. “This shows that even with the Group 15 active ingredients, the biological effects are different depending on the specific herbicide being used.

“To investigate further, we then took this beyond ‘dead versus alive plant’, to look deep into the weed’s biology to know exactly what pathway tri-allate is affecting, and why it’s having this different effect.”

To achieve this, researchers used biochemical techniques to understand what was happening at the tissue and cellular levels in the plant. They found that tri-allate inhibits fatty acid synthesis – crucial for building cellular structures and enabling plant growth – but at two different places and stages, early in the chloroplast and later in the endoplasmic reticulum.

Conversely, flufenacet and EPTC affect only the latter part of the pathway that happens in the endoplasmic reticulum.

“This makes tri-allate unique,” raises Dana. “And in working at multiple sites of action, this makes resistance harder to evolve, which may explain why after 60 years, the chemistry hasn’t failed.

“Furthermore, while the HRAC system is useful guidance, this work does highlight that there’s further complex

biology underpinning Group 15.”

Laurent adds that Gowan had always suspected Avadex was particularly robust, delivering added staying power. “We’ve never known any single-site resistance to occur and we now know why – tri-allate offers multi-site activity.”

While these results are clear, this critical research must continue, urges Dana. “The experiment focussed on application of the actives at pre-emergence stage, but new questions have arisen as the work progressed. For the future, we may also investigate the impact on ryegrass, although we’re relatively confident it’ll have a similar action to what we’ve seen in blackgrass.”

MULTI-SITE ACTION

Gowan’s UK country manager, Hank King, believes the new research should influence how farmers and agronomists perceive tri-allate. “Growers often rely on a single active to do the bulk of the heavy lifting for autumn grassweed control. In those cases, that active has to be protected, which can be achieved by using tri-allate as a robust partner that acts at multiple target sites in the weed,” he says.

“It’s so important to be informed by robust scientific evidence. As such, Gowan is continuing the research with Rothamsted Research to ensure messaging is justified and backed up.”

Looking at this season in particular, Hank adds that when considering Avadex Excel (granule) versus Avadex Factor (liquid), it’s all about timing. “Avadex Excel performs best in drier, warmer conditions, aligning with an application earlier in the season. In contrast, we see Avadex Factor is more suited to cooler situations where there’s more moisture present.

“Timing is key – a well-timed application of Avadex Factor can offer better results than a poorly-timed application of granular tri-allate. Either way don’t hesitate, it still delivers the same mode of action effect.”

Choosing tactics based on conditions is also critical for ADAS’ John Cussans. He says research has shown that if seedbeds are dry, it’s best to leave weed seeds on the surface. “This is critical to manage newly-shed seeds post-harvest because predation occurs as well as direct mortality.



Investigative work

Rothamsted Research’s Dr Dana MacGregor conducted initial experiments to compare the effects of flufenacet, tri-allate and a third active, EPTC, on blackgrass development.

“If growers are drilling cereals particularly, then doing nothing in that instance would benefit weed management considerably, while cultivation consistently increases the germination of freshly-shed blackgrass seeds.”

He notes that work undertaken by Jasper Kanomanyanga, as part of his PhD studies, has compared weed seed predation in no-till versus cultivated situations. “The predation in no-till is astonishing, with nearly 100% predation rates in blackgrass by carabid beetles and small mammals.”

John further urges growers to hold their nerve this season, particularly if grassweeds are a reoccurring issue. “As well as delayed drilling decreasing grassweed densities, we also understand that it can have a positive effect on pre-emergence herbicide efficacy. Ultimately, herbicide effectiveness improves and the chance of requiring a top-up is reduced. This will not change.

“Everyone is feeling the pressure to adapt, but when it comes to grassweed management, nothing has changed. Remember the basics, consider each field, and don’t kid yourself that the weeds are changing because they aren’t,” he stresses.

Despite this strong message, he notes that one aspect has shifted during recent years – herbicide resistance. “We’re working harder to achieve the same goal and using more



Multi-site action

Tri-allate should be used as a robust partner for other key active ingredients, because it acts at multiple target sites in the weed, advises Gowan’s Hank King.

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pre-em to compensate for a lack of activity in spring contact herbicides. Complicated pre-em stacks do incur selectivity risk; complex mixes mean additional interactions,” he warns.

For North Lincolnshire grower Pat Thornton, this coming season the challenge will be ensuring every input delivers on ROI to help fill an impending financial void post-BPS. He says the farm grows continuous cereals including spring barley, and blackgrass is the main weed challenge.

“Autumn 2025 we did drill in early

October, which was probably 10 days early, purely due to temptation. But ordinarily, we’d delay drilling and use spring cropping as part of our core cultural control methods.

“Understanding the fundamentals and established research is helpful in tackling problem weeds, and really, herbicides are the last step. In terms of product choice, it’s actually knowing the value it offers rather than what it costs,” he explains.

Noting the farm’s blackgrass problem, Pat says Luxinum (cinmethylin) forms the base of pre-em applications,



Integrated approach

According to grower Pat Thornton, understanding fundamentals and established research is helpful in tackling problem weeds, and really, herbicides are the last step.

as part of a strategy of using both the best quality practices, and best quality chemistry. “We’re always looking for that additional 1% control, so everything requires that level of detail to step up to the challenge of current finances,” he explains.

“Subsequently, blackgrass populations are decreasing considerably and we’re making improvements. However, you just can’t take the risk, so it’s a no brainer to always do the best you can.”

RYEGRASS

Of course, when it comes to winning the grassweed war, it isn’t all about blackgrass. Italian ryegrass is becoming increasingly troubling due to its evolving herbicide resistance status and extended, sporadic germination.

As such, spring cropping isn’t a robust tool, highlights John. “Unlike blackgrass, ryegrass plants that emerge in the spring can set seeds profusely. So sometimes, spring cropping isn’t quite so effective, whereas for blackgrass you always have that spring crop backstop.”

Ryegrass also has a prolonged germination pattern, meaning herbicide sequencing and multiple application timings generally provide the best level of control, while the weed has an innate ability to develop resistance to herbicides, he adds.

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chemistry is becoming more widespread in ryegrass populations, significantly reducing the reliability of contact herbicides. In some situations, growers are also beginning to see reduced performance from residual programmes.

John notes that despite this, new herbicide release Fundatis (bixlozone (Isoflex active)+ beflubutamid) could be a useful option. Furthermore, rather than simply rotating herbicide groups between seasons, he says the priority should be maximising diversity within individual programmes.

"Options like cinmethylin offer very good activity, but we'd rather growers didn't rely on it too heavily. The objective is to build programmes with multiple modes of action applied at different timings.

"Fundatis is different because it has some foliar uptake on cotyledons. It also has more persistency and should remain active for a long period of time. Because of the foliar uptake as well as root uptake, it performs better pre-em, although also has good activity relatively speaking early post-em.

"It's a different mode of action so all of these elements combined make it quite a contrasting option. Rather than putting on more similar herbicide, applying a contrasting option on is always best advice."

Fundatis can be used at pre- and peri-emergence in winter wheat, and pre-emergence in winter barley.

Beyond specific product choices, John warns that growers should adopt a zero-tolerance approach to ryegrass as soon as it appears. "That initial stage where ryegrass has escaped from cultivated ryegrass, or come in on a baler, is a vital stage to



Taking no prisoners

ADAS' John Cussans warns that growers should adopt a zero-tolerance approach to ryegrass as soon as it appears.

take the problem seriously and address it before it becomes established.

"There are so many farms with a story of how ryegrass appeared in a gateway one year and a few years later it's across the whole farm and costing a fortune. They wish they had a time machine and had done something about it.

"The challenge with ryegrass, even more than blackgrass, is that it'll move around the country with straw residues and harvest equipment. And because you don't know where it was last, you don't really know what's come onto the farm."

His universal advice is to have a zero tolerance approach from the outset. "Other people's ryegrass could be very problematic compared with the ryegrass you're used to. You'll save so much effort and expense in the long run if you just destroy the crop as soon as you see the problem come onto the farm – it's really that important," stresses John. ●

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Ensuring effective weed control from residual herbicides

Grass weeds can cause significant yield and financial losses in wheat. Understanding the different physical and chemical properties of residual herbicides helps build an effective programme to control weeds and preserve yield potential.

The foundation of successful weed control is an effective programme of cultural controls. Stale seedbeds, delayed drilling and ploughing can all reduce germination of black grass, Italian rye-grass, brome and other weeds in the crop. Higher seed rates help suppress weed growth.

The main priority must be a healthy, well-established crop which is more able to compete with weeds and can deliver the all-important yield. When planning weed control make sure all cultural and chemical controls support good establishment.

Once the cultural programme and drilling is complete, it is

time to consider the herbicide programme. **Residual herbicides** remain in or on the soil and are effective against target weed species for a certain period of time, this could range from a few days to several months. This characteristic allows them to be applied before weed germination. These herbicides are usually taken in by the roots or the shoots of emerging weeds but most have limited post-emergence activity.

Actives like flufenacet and metribuzin are soil mobile. They require moisture to reach the weed germination zone for uptake by the roots. Dry conditions and physical barriers in the seedbed can both limit efficacy.

It is important to drill crops to at least 32 mm to keep them beyond the usual zone of herbicide activity to avoid crop effects. Avoid pre-emergence applications when heavy rain is forecast and be particularly cautious on lighter

soils. Using a sequence rather than a stack is also a sensible precaution if crop effects are a concern.

Other actives like Proclus® (aclonifen) and diflufenican are relatively immobile and remain on the soil surface for uptake by the emerging shoots. They tend to be more tolerant of drier weather than soil mobile actives but any soil disturbance after application has a detrimental effect on performance.

Aim for a pre-emergence spray with a mixture of root and shoot activity such as a metribuzin co-form like Alternator® Met, Cadou® Met or Octavian® Met (all flufenacet + diflufenican + metribuzin) plus Proclus®. This tank-mix can cope with a range of conditions and contains four different modes of action (MoA).

Diversity is key

The herbicide's mode of action is the chemical basis for how it disrupts essential

plant processes to kill the weed. Different actives can have the same mode of action. The international Herbicide Resistance Action Committee (HRAC) groups herbicides according to the MoA to help programme planning and resistance management.

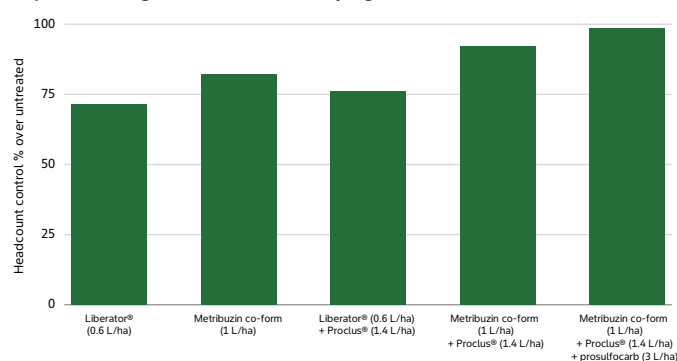
In wheat, there are actives from seven HRAC groups (Group 3, 5, 12, 13, 15, 30 and 32) to choose from for the residual herbicide programme. Aim to range modes of action for efficacy and resistance management purposes.

Trials continue to demonstrate the gains in control from including different MoA in the programme.

See graph 1: Stacking herbicides for Italian rye-grass control

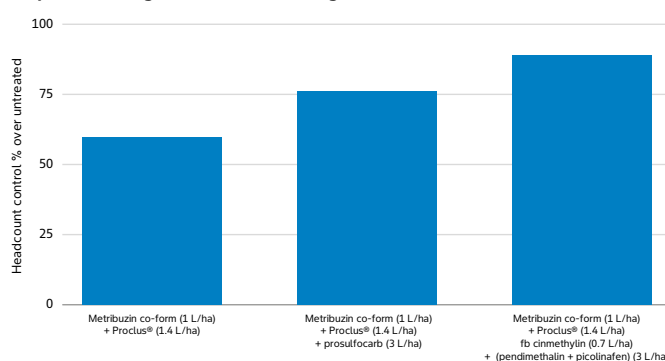
See graph 2: Stacking herbicides for black grass control

Graph 1: Stacking herbicides for Italian rye-grass control



Bayer contracted trials x3 (2022-23) – Pre-em. applied autumn 2022. Average untreated count = 110m²

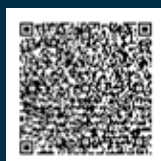
Graph 2: Stacking herbicides for black grass control



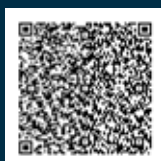
Bayer contracted trials x4 (2022-23) – Pre-em. + sequence applied autumn 2022. Average untreated count = 270m²

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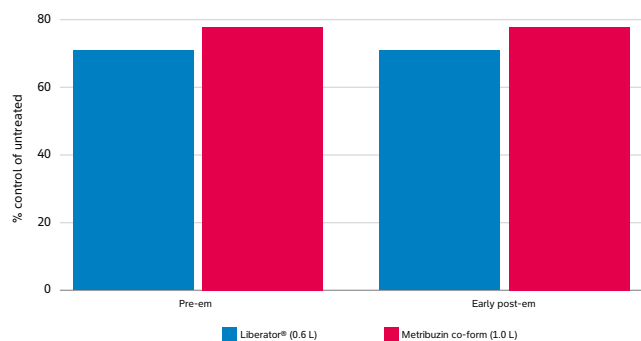
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Graph 3: Benefit of metribuzin at early post-emergence timings



Source: Mean of 5 Bayer black-grass trials in w.wheat Ref. HD14GBR05 (Pre) & B06 (E.Post)

Protection throughout autumn

Soil disturbance from drilling encourages weed germination so the pre-emergence timing is crucial. The ideal spray timing is within 48 hours of drilling so that herbicides can control all emerging weeds. Any greater delay means that some weeds might emerge before herbicide application. Herbicide choice can help mitigate the risks if a delay is unavoidable. Metribuzin co-form products have much smaller drop in control compared to Liberator® (flufenacet + diflufenican).

See graph 3: Benefit of metribuzin at early post-emergence timings

Weeds can continue emerging throughout autumn and into spring. Residual protection helps control any further germination; this comes from the longevity of the pre-emergence spray and additional applications of residual herbicides.

Herbicides degrade in the soil due to chemical reactions (hydrolysis) and microbial decomposition. The speed of decay depends on the active, soil type, moisture

levels and the temperature. For all actives, warm, moist conditions promote degradation whereas dry and cool conditions allow greater persistence. Soil immobile actives like Proclus® tend to take the longest to break down.

Black grass usually has a concentrated germination period in early to mid-October, a second application 1–2 weeks after the pre-emergence spray ensures maximum herbicide levels throughout the main germination period. Italian ryegrass has a more protracted germination, protection for longer is more important so a gap of 2–4 weeks between sprays is better. Brome germination patterns depend on the species but in most cases protection later into autumn is helpful.

Ensure the pre-emergence spray includes actives with good longevity so there is some protection if the follow up is delayed or not possible due to bad weather.

Resistance management

The development of reduced sensitivity and resistance has been much slower in residual herbicides than contact-acting chemistry. However, growing reliance on residual chemistry for grass weed control means resistance management is increasingly important, key steps are:

- Use cultural controls first
- Use actives from different HRAC MoA groups
- Control survivors of residual chemistry with contact-acting chemistry where appropriate
- Use crop rotation to have a wider range of actives to choose from
- Monitor weed control resistance test suspect populations

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1. Bayer UK herbicide trial sites, 2022 – 2023.

2, 3. Pesticide Properties DataBase, University of Hertfordshire, 2026.

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Forewarned is forearmed

Although the devil remains in the detail, the EU-UK realignment deal and SPS agreement look to shake things up when it comes to the chemistry toolkit

With so much unknown regarding the future of UK crop protection, proactive research to establish the best herbicide programmes for the future will be critical, suggests Jodie Littleford, technical manager for combinable crops at Agrii.

"Although it's subject to change, we expect the reset with the EU to come into effect next summer," adds Jodie. "And it's likely to mean realignment with the authorisation of plant protection products."

"If that's the case, then the bad news is we'll lose flufenacet ahead of the GB authorisation review, which would mean an accelerated revocation of this key active that's been the cornerstone of most herbicide programmes for many years."

"We've had the introduction of cinmethylin, which is available in products like Luxigard Opti (cinmethylin+ picolinafen). However, that isn't currently registered in Europe, although BASF is confident it'll be authorised by the time the realignment takes effect. But that, of course, is only registered in winter wheat and spring barley, so that leaves quite a gap in winter barley," she explains.

Without flufenacet, cereal herbicide programmes will look very different in the near future. That's why Agrii has been exploring how to put together consistent and cost-effective programmes without it, notes Jodie.

"New products like Fundatis (bixlozone+ beflubutamid) are available, where both actives have an EU authorisation, so our working assumption is that it's safe from the implications of the SPS agreement. It also has a winter barley label for pre-em use, which means it'll be an important tool in this crop in particular when flufenacet goes."

"This autumn is a good opportunity for farmers to use Fundatis and gain some experience with it," she raises.

Considering the remaining herbicide options, Jodie says it's imperative that they're positioned correctly, using both stacked and sequenced approaches, to ensure the best activity

while reducing the risk of resistance.

Consequently, the best place for an application of cinmethylin is at pre-emergence, urges Jodie. "Its mode of action means it's most active on the weed seed before it germinates, stopping grassweeds emerging from the start of crop establishment. That's why we're pushing for the use of cinmethylin at pre-emergence in programmes."

"By the time the grassweed emerges, the efficacy declines. It still works well compared with other actives, but you're losing the benefit of your best product," she suggests.

Then, Jodie believes Fundatis is a good fit as a peri-emergence top-up in winter wheat crops, should flufenacet be no more. "Although we've seen good benefits of Fundatis in pre-em mixtures, we tend to see the best performance in the peri slot, 2-3 weeks after pre-emergence."

"The reason for this is because of the formulation type. It is a ZC formulation meaning it's a mixture of a suspension concentrate and an encapsulated formulation. The benflubutamid is in suspension, along with 30% of the bixlozone. The remaining 70% of the bixlozone is encapsulated."

"That means you have some of the active freely available in solution to hit the weed as soon as you apply it, giving some contact activity on the small emerging weeds, while the encapsulated portion gives prolonged residual activity," she explains.

Good grassweed control isn't just about herbicide choice. With only one chance to get it right per crop, precise application of pre-emergence herbicides is vital, highlights Jodie. In Agrii's farm-scale application work, the team has been examining nozzle choice, water volumes and adjuvant use to boost grassweed control.

"There's always pressure in the autumn to apply a pre-emergence within 48 hours of drilling," she says. "So there can be a temptation to cut the water volume to cover more hectares per sprayer tank."

"We've seen a steady decline in herbicide efficacy once you start



Strategic planning

Considering remaining herbicide options post potential flufenacet revocation, Agrii's Jodie Littleford says it's imperative they're positioned correctly, using stacked and sequenced approaches, to ensure the best activity while reducing the risk of resistance.

going below water volumes of 200 l/ha. Both flat fans and drift reduction nozzles are similarly affected by water volume; water as the carrier is critical to achieve optimum coverage."

Adding an adjuvant like Backrow Max will increase efficacy by reducing drift, increasing spray coverage and holding the herbicide in the top layer of the soil, reports Jodie. She's seen a consistent benefit when using it with pre-emergence herbicides, however, cautions that it won't compensate for a suboptimal water volume.

She adds that Agrii has also investigated the effect that Backrow Max has on increasing the crop safety of herbicides using Agrii's glasshouse research facility at Throws Farm. Pots of newly-sown spring barley were treated with a herbicide mix that'd typically show some crop effect, and measured the subsequent impact with and without Backrow Max.

"Where we didn't include Backrow Max, the herbicide impacted the germination of the barley and its root development. But in including Backrow Max, we kept the herbicide in the top layer of the soil and reduced movement into the seed zone following simulated rainfall events. This successfully mitigated some of the phytotoxic effects of the herbicide, particularly improving root establishment – which we know is critical in setting up crop potential," she concludes.

The mix partner with value

With a label extension creating more flexibility for ethofumesate's use in winter wheat, the herbicide is proving a valuable mix partner as growers strive to tackle difficult grassweeds. *CPM* takes a closer look at Xerton.

By Janine Adamson

Ethofumesate – historically regarded as a staple, cost-effective tool for grassweed management in sugar beet. However, following a recent label extension, the herbicide is starting to find a firmer footing in winter wheat crops too, particularly when it comes to controlling blackgrass and brome.

While Xerton (ethofumesate) has been authorised for use in winter wheat since 2015, this was limited to post-emergence only, despite trial work suggesting it was most effective when used at pre-emergence timing, explains UPL's Tom Wheelhouse.

Now, with pre-emergence use under its belt for a year, he believes this truly opens up a window of opportunity for growers. "Undoubtedly, it works best at pre-emergence stage of the grassweed, prior to the formation



Greater flexibility

According to UPL's Tom Wheelhouse, with pre-emergence use now on its label, suddenly Xerton is a far more compelling option.



"Xerton performs well as a pre-emergence residual treatment because it targets weeds via shoot uptake as they push through the soil surface."

NIGEL SCOTT

of the waxy cuticle. While there's limited activity when the weed is just emerging at the little green stick phase, as soon as a leaf is out, the activity drops off," he adds.

Critically, it's what Xerton adds to a tank mix that should pique the attention of growers now it can be used at pre-emergence, believes Tom. "Trials indicate Xerton offers around 8-10% uplift to a pre-em herbicide stack when it comes to controlling blackgrass."

NEW ADDITION

"For a lot of growers, that'll be relatively consistent, as ethofumesate isn't an active they'll have used on heavier land because crops like sugar or fodder beet don't feature in the rotation. Of course, where grassweeds have been exposed to the active, performance will likely be reduced somewhat," he comments.

Tom adds that with pre-emergence on its label, suddenly Xerton is a far more compelling option. "If we look at other active ingredients used at this timing, although ethofumesate is in HRAC Group 15 therefore the same as the likes of tri-allate and flufenacet, it belongs to a different family within that group.

"It behaves differently, which means as well as offering an uplift in control, it contributes positively to resistance management across the entire weed control programme. Equally, this further strengthens its position as a go-to tank mix partner to protect those critical, premium actives," he explains.

To help affirm this, Tom raises that work is currently taking place to explore and quantify ethofumesate's mode of action in practice. "It might be an older product, but it has a new use, so therefore we want to fully understand its mechanism to reinforce its position and instil trust."

As well as offering valuable activity against blackgrass, Xerton also controls brome, highlights Tom, and is active against all species. "For sterile and great brome, it's a useful partner to add to the pre-emergence stack. For spring-germinating bromes it'd be preferable to hold applications back to be post-emergence of the crop, although still pre-emergence of the brome," he advises.

The role of Xerton in brome control is something that agronomy company ProCam has been exploring following continued uncertainty regarding the



Brome control

ProCam has conducted trials to seek alternative options to flufenacet, with Xerton offering promising results in the context of soft brome, notes agronomist and northern region technical manager Nigel Scott.

- long-term future of flufenacet. After the European Commission's non-renewal of the active ingredient in the EU and Northern Ireland in March 2025, fears remain that UK authorities may follow suit in due course.

With that in mind, ProCam has conducted trials to seek alternative options, with Xerton offering promising results in the context of soft brome. Agronomist and northern region technical manager Nigel Scott says preliminary observations suggest that despite established blackgrass herbicides such as cinmethylin and/or flufenacet forming an important element of brome control, additional molecules and modes of action are also required.

"Xerton performs well as a pre-emergence residual treatment because it targets weeds via shoot uptake as they push through the soil surface. I've used Xerton in conjunction with 2.0 l/ha of Tower (chlorotoluron+ diflufenican+ pendimethalin) to good effect against brome, which can be difficult to control at the best of times. Having Xerton at pre-em certainly stands out as a useful addition to the crop protection armoury."

Nigel highlights that Xerton's new flexibility should give a good level of reassurance for growers who've faced a few autumns of early drilling and dry seedbeds. "Flexibility for products to be applied either pre- or post-emergence is key to allow chemistry to be deployed at the most effective time."

"Last year, we saw in ProCam trials that when crops were drilled early, delaying applications of the most potent chemistry helped to improve weed control; with a pre-emergence herbicide chosen with activity in dry

conditions. Where there's moisture however, or where drilling is more usual or delayed, the strongest chemistry should be applied first.

"Xerton now fits either scenario, meaning farmers don't have to change the product choice if the season or weather changes planned approaches," notes Nigel.

ProCam's southern regional technical manager, Paul Gruber, has also been trialling Xerton in herbicide programmes. "Where I've used Xerton as a tank mix partner with robust pre-emergence actives such as cinmethylin, it's certainly packed a significant punch against blackgrass."

COST-EFFECTIVE

"In fact, I'd go so far as to say that a pre-em treatment of Xerton plus Agardia (cinmethylin+ picolinafen) performs on par with Avadex (tri-allate), and at a much lower cost point."

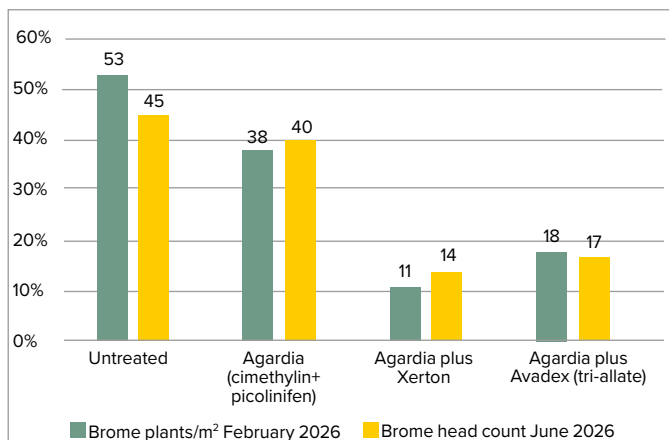
Paul agrees that for brome, Xerton

is preferential to flufenacet, but warns that timing is essential to avoid crop effects. "Peri-emergence application must be avoided," he stresses. "Also, Xerton isn't a direct replacement for flufenacet as it's ineffective against ryegrass. That said, it's certainly a promising addition to the herbicide stack in other scenarios, and I've seen good results when it has been used later in the autumn to top-up pre-emergence treatments," he says.

Tom highlights that as with other grassweed herbicides, Xerton also offers a level of broadleaf weed control, particularly chickweed and cleavers. And while in-field conditions are currently exceptionally dry (mid-August), another benefit of the product is its soil persistency.

"In-house observations indicate it's active within the soil for around 8-10 weeks post application, which is particularly helpful in catchy conditions," he says. ●

Soft brome trial – Tollerton, York



Source: ProCam 2026

Product in Focus

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through sustainable agriculture and a grower-first mindset. With a robust portfolio of holistic solutions, UPL aims to create shared growth and prosperity for farming communities, agriculture, and the planet.

Among UPL's portfolio is Xerton – a selective systemic pre- and post-emergence herbicide containing ethofumesate, for the control of grassweeds in winter wheat. Specifically, the product can be a useful tank-mix partner to products specifically targeting blackgrass management, with the most effective control achieved when applied at preemergence of the weed.

Xerton should be applied no later than the end of October at one application per crop.

CPM would like to thank UPL UK for sponsoring this article and for providing privileged access to staff and the material used to help bring it together.



Lightning can strike twice?

"If we can grow it well, it does leave a good margin behind it."

DAVID BRISTOW

Despite a largely disappointing harvest for many on the back of a prolonged drought, oilseed rape has emerged as a star performer the second season running. *CPM* speaks to farmers across the UK about harvest results and the plans for next season.

By Charlotte Cunningham

After several years in which conversations around oilseed rape have been dominated by crop failures, cabbage stem flea beetle and growers questioning whether the risk was still worth taking, the mood appears to be shifting...

Because while Harvest 2026 has delivered plenty of disappointment elsewhere in the rotation, OSR has once again emerged as something of a top performer.

United Oilseeds is forecasting average UK yields could exceed 4t/ha for the first time, comfortably ahead of the long-term picture. For context, AHDB figures put the UK 10-year average at around 3.3t/ha, while last season's national average of 3.7t/ha was already one of the strongest performances since 2017. It means two successive

seasons of encouraging results are beginning to rebuild confidence in a crop which, only a few years ago, many growers had all but written off.

DEEP ROOTING

Perhaps most strikingly, that performance this season has come against the backdrop of prolonged drought across large parts of the country. While the same dry conditions have taken their toll on other crops, OSR's deeper rooting appears to have helped it access moisture further down the soil profile and maintain yield.

But weather is only part of the explanation. Improved genetics, greater understanding of CSFB and – perhaps most importantly – more flexible approach to establishment are all beginning to change the odds

in growers' favour, and although experiences vary considerably from north to south, those factors are evident across farms reporting some of their strongest OSR results for years.

For Northumberland grower Andrew Reed, OSR has proven one of the standout performers, with this year's crop yielding close to 5.5t/ha.



Top of the crops

Northumberland farmer Andrew Reed says his OSR has been a fantastic crop throughout, holding up to the weather conditions and delivering the kind of performance that he'd hoped for.



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Farming 800ha of mixed arable cropping near Berwick-upon-Tweed, Andrew grows OSR around one year in seven at East Anscroft Farm, and although he admits growers further south would probably 'snap his hand off' for the harvest they've had in the north east, OSR in particular has given little cause for complaint.

STRONG ESTABLISHMENT

Drilled between 15-20 August last year, with LG Adapt replacing previously-grown Aurelia, good establishment set the crop on its way, notes Andrew. The crop was drilled using a seeder mounted on a Simba SL 400, alongside liquid starter fertiliser and slug pellets, before Cambridge rolling. "The weather was good last August, so we drilled the OSR into good conditions and establishment was fantastic," he recalls. "We applied the autumn sprays, and the crop came through the winter very well, without much pigeon damage."

That latter point is significant in this part of the country, where Andrew says pigeons can pose as much – if not more – of a threat to establishing OSR than CSFB.

He says that from there, the crop continued to thrive. A total of 245kgN/ha was applied across three splits, alongside variable-rate phosphate and potash, while spring fungicide applications targeted stem extension and flowering. "Fertiliser and spray applications all went on at the right timings, and the crop looked absolutely superb at flowering," he adds. "It flowered for a long time because there was no significant rainfall to knock the petals off or any wind."

The final hurdle was navigating what Andrew describes as the crop's customary 'white knuckle ride' through to harvest, with the threat of hail and strong

winds particularly pertinent on the farm's relatively exposed ground. But patience paid off, with combining completed safely on 2 August and yields estimated at around 5.4-5.5t/ha. "It's been a fantastic crop throughout, holding up to the weather conditions and delivering the kind of performance that we'd hoped for."

With OSR continuing to earn its place as a valuable break crop in the rotation, attention has already turned to Harvest 2027. Recent rain in the region means conditions are markedly different to those facing many growers further south, and half of the farm's next OSR crop is already in the ground. "We've had quite a lot of rain this last fortnight, so half of it is already drilled and we'll get back to the other half once we've finished cutting the rest of the crops," he concludes. "Fingers crossed there's no flea beetle."

Further south, the story is less about OSR maintaining its place, and more about earning it back. For Lincolnshire grower David Bristow, this year's crop represents more than a respectable 4.04t/ha yield – it marks a successful return to something which had become increasingly difficult to justify.

Farming 650ha at Stourton Estate on the edge of the Lincolnshire Wolds, David stopped growing OSR in 2022 after CSFB pressure culminated in the failure of an entire field. "It just became harder and harder to grow until it culminated in a failed crop, and we decided then to take a break for a while."

But finding a replacement proved equally challenging. Linseed was trialled for a period, while oats and a small area of beans remain in the rotation, alongside grass following the introduction of cattle – yet the loss of a profitable break crop was noticeable.

Seeing successful OSR

crops locally during Harvest 2024 helped to give David the confidence to try again, with 52ha of LG Avenger subsequently grown for harvest 2025. The crop yielded 4.04t/ha and, while slightly below expectations, strong oil content brought additional bonuses. "I was slightly disappointed in the yield, but it was still quite good. The oil was very good, so there were quite a few bonuses to be had there once you had it analysed."

Varietal improvements have played a part in rebuilding that confidence, particularly vigorous autumn growth and greater resilience to CSFB. But David believes establishment decisions are just as important. Last year's crop followed winter barley and was drilled with a Horsch Avatar during the final week of August, following low-disturbance subsoiling. Crucially, drilling was held back until there was sufficient moisture, helping the crop to establish quickly and evenly.

RINSE AND REPEAT

That same principle is guiding this autumn's decisions, he explains. "Wait until we've had rain, or at least it's forecast and there's a substantial amount – that's what I'm going off. If there was rain earlier in the year I was ready to drill it earlier, it just didn't come in any amount."

For David, having OSR back in the rotation also matters financially. With uncertainty surrounding future farm support, crops increasingly have to justify their place on their own merit. "If we can grow it well, it does leave a good margin behind it. It's not that expensive to grow, albeit it's all front-loaded."

And while CSFB means there are no guarantees, he believes growers are becoming better at managing that establishment risk. "The varieties have a big part to play – that really rapid growth in the autumn to get away from adult damage. New varieties are starting to help, and I think we're just getting slightly



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That willingness to wait for the right conditions is also central to the approach taken by Herefordshire grower Edward Godsall – although unlike David, OSR never quite disappeared from his rotation.

Edward farms around 350ha of predominantly arable cropping near Ledbury, growing cereals alongside

herbage and vining pea seed crops. Despite the combined challenges of CSFB and increasingly unpredictable weather, he's continued growing the crop throughout. “We've always grown it, even during the super challenging years. There were times where it was very close, but we just valued it as a good break crop around here.”

CONDITIONS FIRST

CSFB pressure has noticeably eased during the past couple of seasons, although Edward isn't taking its absence for granted. Instead, his establishment strategy has gradually shifted later, with conditions taking precedence over conventional drilling dates. “I'm never really one to worry too much about calendar dates. It's the old

The later drilling equation

Whether driven by dry conditions or deliberate establishment strategy, experts are warning that later-drilled OSR may require a tailored approach to agronomy this autumn

With the continued drought leaving seedbeds dry across much of the country, many growers are likely to be drilling OSR later than they might have originally planned this autumn.

For some, this means heading into the September drilling window – perhaps for the first time. But while this may potentially help crops to avoid peak cabbage stem flea beetle migration, with less time available to build sufficient biomass before winter, later drilling brings its own agronomic considerations.

This is according to ProCam head of crop nutrition, Andrew Cromie, who says the priority should be to get crops established quickly and build enough resilience to carry them through winter. “Farmers are returning to growing OSR and, weather permitting, we could see plantings increase by 10-20% compared with the 2025-26 season,” he suggests.

“If drilling later, a key objective will be to accelerate the crop's growth so that it reaches 8-10 true leaves and has a tap root collar diameter of more than 8mm before winter dormancy. This gives it the best chance of having sufficient reserves to grow away again well in spring.”

As a starter, Andrew says the fundamentals of a good crop require selecting a variety with excellent autumn vigour to help compensate for the crop going in the ground later. “We've seen consistent results over several years with the hybrid RGT Blackmoon. Equally, ensure suitable availability of macronutrients – nitrogen, phosphate, potassium and sulphur – as well as key

micronutrients, so that growth isn't hindered. Plus, there's also a strong case for applying a biostimulant.”

Andrew says the nutritional challenge is likely to become greater as drilling moves later, particularly as declining soil temperatures reduce mineralisation and nutrient availability. Therefore, maximising nitrogen availability in the seedbed or shortly after drilling, while remaining within relevant restrictions, could therefore become increasingly important.

“In addition, starter fertilisers placed under the seed, such as Microstar Actif Bzn, which supply both water-soluble phosphate and protected phosphate that stays available to the plant, will help to kickstart early root expansion.

“Root growth slows down in cold, wet soils. So adding an early foliar phosphite treatment, such as Incite at the cotyledon to 2-leaf stage, will help to trigger lateral rooting and the overall nutrient scavenging ability of the plant.

“Meanwhile, potassium and sulphur are important for the efficiency with which the plant is able to use the N that's available. The treatment Fulvivex contains key nutrients, especially K, but also 62% fulvic and humic acids which help to ensure K reaches the plant in a bioavailable form and which also have a biostimulant effect. I'd consider applying this at 6-8 true leaves.”

Boron is also critical, continues Andrew. “Fast-growing OSR consumes it rapidly, and deficiency can lead to hollow stems, vascular collapse and stem splitting. So applying foliar boron from



ProCam's Andrew Cromie says the priority should be to get crops established quickly and build enough resilience to carry them through winter.

the 2-4 leaf stage can help to maintain stem integrity. Fulvivex also provides some boron.”

Andrew says molybdenum is another nutrient to watch during establishment, because of its role in nitrate reductase efficiency and helping seedlings to convert absorbed N into protein. Manganese and zinc also support photosynthesis and root development, with unconsolidated seedbeds particularly vulnerable to deficiencies, he adds.

But while later drilling may put greater emphasis on nutrition, Andrew stresses it can't compensate for shortcomings in the seedbed itself. “Nutrition alone can't overcome poor soil management. So it's also important to achieve a soil pH of 6.5-7 to reduce lock-up of key macro- and micronutrients, and to make sure compaction is addressed to allow roots to access nutrition and water efficiently.

“Where possible, leveraging the benefits of organic manures is also encouraged. Not only can they feed the plant with essential nutrition but also improve soil biology. Their benefits can be further improved with the use of foliar nutrition and biostimulants.”

classic, conditions over calendar. I'm happy to keep planting up until mid-September, and that's what we've edged towards during the past few years – we've actually gone later and later, rather than earlier and earlier."

Last autumn, most of the crop was drilled around 16 September. Despite some flea beetle activity in a couple of fields, the crop quickly outgrew the damage and entered winter in good shape without becoming excessively forward – another advantage Edward sees from holding back drilling on the farm's heavy clay soils.

The strategy ultimately delivered, with LG Adapt and LG Armada grown this season and Adapt proving the stronger of the two. Harvest arrived unusually early in mid-July, with the crop averaging around 4.2t/ha against a five-year farm average of about 3.7t/ha. "The Adapt was probably our leading light of the two. There wasn't a lot to choose from between them, and we would have averaged about 4.2t/ha, which for us is pretty good. And to average that as well, that's not me just finding the best parts."

Of course, two good harvests don't mean CSFB has disappeared. Instead, the argument from United Oilseeds is that growers now have a broader range of tools with which to manage the pest and, importantly, establishment risk as a whole.

Alongside drilling into adequate moisture and improvements in autumn vigour from newer genetics, research continues to explore additional approaches, too.

One currently attracting attention is shallow post-harvest cultivation. Work through the four-and-a-half-year CSFB Research+ project, led by Colin Peters and the Niab team, is investigating whether light cultivation immediately after harvest can disrupt flea beetle populations developing in the soil. Early findings suggest reductions in emerging adults of 50-80%. However, in this season's exceptionally dry conditions, experts say creating a shallow tilth may offer an additional benefit by helping rainfall infiltrate rather than running from hard, capped surfaces.

It all points towards establishment becoming less about finding one silver bullet and more about stacking small advantages in the crop's favour – from soil moisture and drilling date to genetics and cultivation strategy. That flexibility is particularly evident on Edward's farm. At the end of August,

he was still 'literally waiting for the rain', confident that his usual September drilling window gives him room to respond when conditions improve.

Looking ahead, if the national average does break the 4t/ha barrier, it'll undoubtedly provide another confidence boost and on farm, Andrew already has half of next year's crop drilled, David has committed to growing OSR again, and Edward remains prepared to wait into September for the conditions he wants. So it appears the question for autumn 2026 is increasingly not whether to grow it – but how best to give it the start required to deliver again...

Variety choice across these case studies is coincidental. ●



A successful return to the rotation

For Lincolnshire grower David Bristow, this year's crop represents more than a respectable 4.04t/ha yield – it marks a successful return to something which had become increasingly difficult to justify.

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The key to unlocking P

“The question arose regarding how better to access the locked up P.”

BARRY WILLIAMS

Following the launch of the phosphate stewardship guide and hub, the principles behind the recommendations are already being put into practice at one Hertfordshire mixed farm. **CPM** learns how P availability has been improved for a healthier and more efficient maize crop.

By Janine Adamson

Rather than continue as per recent years, grower Bridget Borlase had a challenge for ProCam agronomist Barry Williams – to grow a maize crop with minimal bagged fertiliser while better utilising soil-P reserves.

Based in Hertford, the jewel in Sacombe Hill Farm's crown is a long-established pedigree Simmental herd, meaning not only is quality forage an important aspect of the business, but in return, there's plentiful access to organic manures.

While the main reason behind the challenge was to manage input costs, environmental concerns and adhering to nutritional best practice were also key drivers, highlights Barry. “The farm has always grown forage maize as part of its rotation, usually opting for 150kg/ha of DAP down the spout at drilling.

“However, with volatility in fertiliser prices, plus knowing that the field in question had always tested high for P and K indices due to organic manure applications, the question arose regarding how better to access the locked up P.”

Utilising the P already present in the

soil also has environmental benefits – contributing to reducing P levels in the soil. Phosphate run-off from agricultural soils into local watercourses increases as soil P index increases above 2, which causes eutrophication and reduces water quality.

So understanding that up to 90% of phosphate fertiliser applications can become locked up within days, with only the P within the soil solution immediately available to plants, meant Barry had to think far beyond simply applying more.

As such, being familiar with De Sangosse's product range led him to the company's soil nutrient activators, in the hope that application with the crop's pre-emergence herbicide would improve access to the existing P reserves.

“Maize requires phosphorus early in its life cycle, to help set the foundations for its ultimate performance,” says Barry.

“But despite it being a highly challenging and dry season, the maize didn't look back, it showed no signs of deficiency. This was then followed by an application of foliar P-smart at 4-6 leaf stage, and urea polymers at

waist high. In terms of the crop's total nutrition, that was it,” he recalls.

According to Barry, P-deficiency in maize is highly obvious. “However, walking the crop there were no visual signs such as purple discolouration or stunting. Therefore, it's clear that the soil nutrient activator worked.”

Having recently launched the phosphate stewardship guide and hub, De Sangosse's Rob Suckling explains that this is because when soil nutrient activators are applied to soil, cations preferentially bind to the product components, rather than phosphate or soil particle surfaces.

“The cation complexes formed allow more phosphate to enter into the soil



Agronomy challenge

ProCam agronomist Barry Williams was challenged to grow a crop of maize with as little bagged fertiliser as possible.

solution, but these complexes also enable plants to assimilate other cation nutrients such as zinc, copper and manganese that may be unavailable due to chemical fixation or multidentate bonding with soil particles.”

In Barry’s case, because the soils at Sacombe Hill Farm were high-P index, this meant using a soil nutrient activator was particularly relevant, he notes.

“The key is to identify where using these products will be most beneficial – usually in calcareous situations where free calcium cations lead to fast fixation of phosphorus. Always conduct a base assessment – is the crop likely to respond to phosphorus, if so, unlocking it from the soil and extracting what’s already there will likely benefit it too.”

It could be that the arid spring and summer may also have had an impact, suggests Rob. “It’s been a majorly dry season, particularly in the East. As well as the obvious – crops take up nutrients with water – equally, as the soil gradually dries out, nutrients become tightly bonded on the soil surface as moisture precipitates.

“Soil nutrient activators essentially tear the nutrients off the soil and convert them to a highly useable form, remaining active for around 6-8 weeks,” he explains.

Having now seen the maize through to harvest, Barry notes that despite taking an alternative approach to nutrition, the crop performed similarly to other conventionally treated fields in the area.

Plus with two seasons of use under his belt, Barry says his next step for Bridget is to conduct hectare grid

soil sampling across the whole farm this autumn, as well as extend the use of soil nutrient activators into cereal crops, where appropriate.

“The cost of DAP is rising to around £800/t, so combined with the potential of carbon accounting, I believe products like soil nutrient activators will only grow in importance in the coming years.”

While this has been the correct approach for Barry and Sacombe Hill Farm, it isn’t a broad solution for all farms, urges Rob. Reflecting back on the stewardship guide, which is based around the strapline ‘Protect it. Place it. Unlock it.’, he says a full system approach is required.

SYSTEM APPROACH

“Phosphorus management is a system, not a single input, and requires actions to help manage availability, access and reserves. This could mean maintaining its availability after application, improving early root access, and finally, utilising the existing soil reserves.”

For the ‘protect’ aspect of the guide, this could mean using phosphate protection technologies (PPT), which work through reducing the fixation by soil minerals to maintain P in its plant-available form, explains Rob. This is relevant where there is a crop P requirement and levels of soil P allow for further P input.

“PPT can be delivered as a coating which is applied to starter fertiliser granules. When the granules dissolve and phosphate moves into the soil water, the coating enters the water first, sequestering the cations that



Preferential binding

When soil nutrient activators are applied to soil, cations preferentially bind to the product components rather than phosphate or soil particle surfaces, explains De Sangosse’s Rob Suckling.

fix phosphate in the soil. These cations are then unavailable to react with the phosphate,” he adds.

For ‘place’, this is about better targeting P from the beginning to increase early root interception and boost crop establishment. “These can be protected microgranular fertilisers – placed underneath the seed within the developing root zone.

“By improving early establishment and rooting, this increases the crop’s ability to capture phosphorus and other nutrients from the soil throughout the rest of the crop’s life,” he highlights.

But regardless, it all begins with robust diagnostics. “Crop performance, grain/plant analysis, soil analysis, rooting, establishment and field observations should all be considered together. In doing so, this helps to identify the limiting factors at play, and inform subsequent action,” urges Rob. ●

Innovation Insight

The challenge isn’t P supply – it’s P availability, and that’s something De Sangosse is striving to address through its recently launched phosphate stewardship guide. Delivered in conjunction with ADAS, the guide’s goal is to support growers to maximise crop performance while protecting water. ‘Protect it. Place it. Unlock it.’

Furthermore, De Sangosse has launched a new phosphate stewardship hub and phosphate clinic video series to help growers and agronomists better understand what may be limiting crop phosphorus uptake and what they can do about it.

At its heart is a simple principle: it’s not how much phosphorus you apply, it’s how much the crop can access and use. The new hub brings together information on crop uptake,

grain analysis, soil phosphorus status, root access, phosphorus availability and existing soil reserves.

This is supported by the new phosphate clinic, a series of short videos featuring ADAS’ Dr Christina Baxter and De Sangosse’s Rob Suckling. Together they explore practical questions including what harvest can reveal about phosphorus uptake, why crops may struggle to access phosphorus, how to diagnose potential limitations and how different stewardship approaches can be used.

CPM would like to thank De



Sangosse for sponsoring this article and for providing privileged access to staff and the material used to help bring it together.

To access the guide, the new Phosphate Stewardship Hub and Phosphate Clinic, visit the De Sangosse website:





WITH GUY SMITH

Smith's SOAPBOX

Burgeoning bureaucracy?

“ My mum passed away in July, so the worrying news is that I'm now

an orphan. She was 95 and increasingly infirm so it was a bitter-sweet moment. We were sad to see her go, but at the same time, felt lucky to have had her for so long.

The heart-filled eulogies at her funeral were cause for reflection. It reminded us she came from a very different post-war world to today's times. The fact that in 1942 at the age of 11 she lost her father in a Luftwaffe bombing

raid is a reminder that the 'good old days' weren't as good as we sometimes think.

Mum was happy with the label 'farmer's wife' and wrote that on her passport as her occupation. As a child I played with a set of Britain's farm models which included some farmyard characters; the 'farmers wife' was a long-haired woman dressed in overalls carrying a heavy bucket across a farmyard – she could have been modelled on mum.

In contrast, the 'farmer' dressed in a tweed jacket and carrying a gun looked far more prestigious but somewhat idle. Indeed, that wasn't unlike dad who wore a tweed jacket, flat cap and collar and tie to work every day.

Like most women on family farms, to pigeon-hole mum as

an add-on to my father doesn't begin to write her story or appreciate her contribution. When I made notes for the eulogy, you couldn't but feel a bit breathless at the roles she had both on and away from the farm. From establishing a village Girl Guide pack to working on various hospital boards; from captaining Clacton Hockey Club for decades to cycling thousands of miles to raise money for Macmillan nurses and much more besides – it was humbling.

One of mum's roles was running the farm office. It made me reflect on how red tape and paperwork have changed during the past 50 years. We often assume it's become far more burdensome, thus bleeding time and resources away from food production, but I'm unsure that stands up to much proper analysis.

For starters, until the 1980s, there was no benefit from the array of electronics and computers that populate farm offices today. Mum's desk calculator was mechanical with a large cranking handle on the side which when pulled, printed out the calculation onto a roll of paper, while wages were determined by hand on a system called Kalamazoo.

Printing copies of forms was done on the Gestetner machine. Having prepared the master copy on a manual typewriter, the Gestetner reeled out copies with all the heavy labour of a large Victorian butter churn. In short, working in a 1960s farm office was probably the equivalent of a session in a gym.

Then there was the reams of paperwork to apply for endless schemes. By way of one example, every year an application for the wheat deficiency payment scheme

was put into the post. The MAFF form required a record of the sown acreage, the harvested yield and the amount of crop sold, all of which needed verifiable evidence. Applications for these subsidies for other crops and livestock had to go through the same tiresome rigmarole.

On top of this there were strict quotas for crops such as potatoes to adhere to, with more form filling. Then there were grants to apply for – drainage, hedge removals, grants for concreting the yard – the list was endless.

To police this morass of bureaucracy the ministry had an army of farm inspectors who could arrive at any time to check records and verify data used to apply for those all-important farm subsidies. So when we moan today about SFI applications or yearly assurance inspections, we should remember there was a time when the burden of red tape was undoubtedly worse and it was 'farmers' wives' who bore the yoke.

On reflection, it's probably the case that the reason there's more moaning about having to keep farm records isn't because of an extra workload, but because men have got involved. ●

YOUR CORRESPONDENT

Guy Smith grows 500ha of combinable crops on the north east Essex coast, namely St. Osyth Marsh – officially the driest spot in the British Isles. Despite spurious claims from others that their farms are actually drier, he points out that his farm is in the Guinness Book of Records, whereas others aren't. End of. @essexpeasant

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Strength in diversity



“Ultimately for me, the future is all about being curious and just trying to find another way of doing things.”

PAUL BAKER

Having recently gained national recognition for his approach to soil management, Devon mixed farmer Paul Baker is proving that strengthening an arable system doesn't have to mean spending more. From variety blends and heritage genetics to companion crops and reduced inputs, *CPM* finds out how questioning convention is helping to spread risk and build resilience.

By Charlotte Cunningham

Devon may be renowned for its mixed farming landscape, but at Paul Baker's 142ha business, the term 'mixed' extends far beyond simply having crops and livestock.

Here, organic and conventional systems sit side-by-side – wheat grows among beans and oilseed rape with vetch, livestock are increasingly being brought into the arable rotation, and even a single wheat crop can comprise five different varieties. Meanwhile, cover and catch crops, reduced cultivations and a growing interest in what's happening biologically beneath the soil surface are all becoming part of an increasingly diverse picture.

There's experimentation at almost every turn, but importantly, it isn't

experimentation for experimentation's sake. Underpinning it all is a relatively straightforward objective – to create a farming system which costs less to run, carries less risk and is consequently better equipped to cope when conditions turn against it.

HIGH FLYER

It's an approach that's recently gained national recognition through the Soil Farmer of the Year competition, although Paul admits the journey didn't begin with grand ambitions around soil biology or regenerative agriculture – it all started with economics. “It probably is a little bit embarrassing to say it wasn't because I thought that nature was the answer. I was just



Working in synergy

At Paul Baker's 142ha farm in Devon, the term 'mixed' extends far beyond simply having crops and livestock.



Soil Farmer of the Year success

Paul Baker (centre) was recently awarded second place in the annual Soil Farmer of the Year competition. Also pictured: winner, Chris Molyneux (left) and Colin Chappell (right).

- ▶ going down the road of, 'okay, this is much cheaper, I'm trying to save money and still be here in 10 years.'

"But actually, it turns out leaving it to nature probably is the answer because it does it for free."

That pragmatism perhaps explains why the system which has emerged is difficult to place neatly into any one farming camp. Paul runs organic and conventional land side-by-side, takes ideas from both and is continually experimenting with ways to make each more resilient, rather than working towards a fixed blueprint.

Alongside the arable enterprise, he rears 60 organic replacement dairy heifers for a neighbour and around 7000 ducks at a time, while he's also considering how other livestock could have a greater role. He says the aim is to bring livestock back into the cropping wherever they can perform a useful job.

The arable rotation is similarly fluid. On the conventional land, wheat, barley, OSR and beans form the core of the operation, but Paul deliberately avoids setting the rotation in stone.

"Markets, conditions and what the soil requires can all change the plan," he notes. "Everything's evolving all the time. If I talk to you now about the rotation, it'll change next week."

"Nothing's set in stone anymore like it used to be, which keeps us guessing, the agronomists guessing, and any sort of pest guessing as well."

DIVERSITY DELIVERS

Increasingly, the common denominator is diversity and Paul says that might mean another crop in the rotation, livestock grazing cereals, a companion species growing beneath the main crop or several varieties occupying the same field. "Generally, I'm trying to introduce more diversity, whether that's livestock, or even microbes," explains Paul. "No plant is sown as a monocrop. It's always either as a companion to start with and then we'll take it out, or it could be a variety blend."

That philosophy is a considerable departure from the farming system Paul returned home to in 2013. At the time, establishment centred on

a plough and combination drill and, initially, his attention was less on changing the system than making the existing one work more efficiently. "I thought, okay, we'll just be more efficient with things and get the timing better, and it just sort of – nothing changed from year to year. We couldn't feel that anything was improving."

The first step away from that approach came with a £4000 set of second-hand discs, initially bought with the organic ground in mind but soon put to work in the conventional system. The first season wasn't an instant success, with a noticeable yield penalty from discing followed by combination drilling, but it was enough to keep Paul experimenting.

An equally inexpensive 4m KRM tine drill followed, but at which point he'd also started monitoring the time and diesel required for individual field operations – and the figures were beginning to provide a compelling reason to keep changing. "The amount of fuel saving was ridiculous," he says. "I knew how much fuel and how long it

took to do an operation on each field, so it was apparent that the combination drilling was really burning some diesel.”

Today, the conventional system has moved another step further. Paul has converted a 3m Simba Freeflow from 12cm to 25cm row spacings and fitted narrow JJ Metcalfe legs to create a strip-till drill. “So we’ve gone from two really high diesel usage passes in the plough and combination drill, to two faster, lower fuel usage passes in the tine drill and discs. Now we have one pass.”

Across the wider system, diesel use has fallen by around 75%, while crop performance has been maintained. And although reducing cultivation was the starting point, perhaps its greatest impact was prompting Paul to ask the same question of almost everything else

he was doing – does this operation, or input, genuinely earn its place?

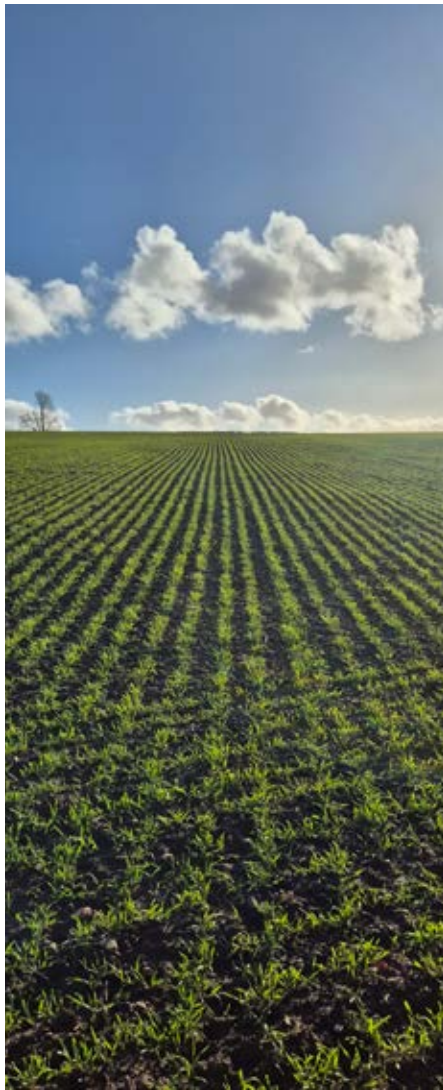
Nitrogen on conventional wheat has progressively fallen from around 180-190kgN/ha, with Paul aiming to remove roughly another 10kgN/ha each year. He’s now down to around 150kgN/ha.

At 160kgN/ha last season, wheat yielded around 9.9t/ha against a budget of 7.4t/ha, helped by rain arriving when it was needed and fungicide spend was minimal, with only one application late in the season. This year, in starkly different conditions, wheat yielded closer to 6.2t/ha. Yet Paul argues that looking at yield alone misses the point. “Some people are losing money, whereas we’re just making less.”

It’s this lower-cost base which

increasingly shapes decisions about everything from chemistry to crop choice – and importantly, the genetics expected to perform within the system. Paul is openly sceptical about accepting variety claims at face value. Instead, he’s increasingly interested in seeing what individual genetics actually do on his farm, under fewer inputs and alongside other varieties or species.

For the past two or three seasons, that has included growing winter wheat as a five-way blend. The current mixture comprises Extase, Beowulf, Champion, Mayflower and Graham, and the extreme conditions this season offered an unexpected insight into how differently those genetics could respond. “There



Bumping diversity

No plant is sown as a monocrop – it’s always either a companion to start with and then Paul takes it out, or it could be a variety blend.

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VARIETIES Cereal varieties

- ▶ was one variety that wasn't killed off by the heat in early May, and we believe that was Mayflower."

The difference really became apparent at harvest, where hand-threshed samples were testing at around 10-11% moisture, suggesting the crop was ready to cut. Yet once the combine entered the field, moisture readings climbed to around 16%. Closer inspection revealed a small proportion of the blend was still green and doughy, explains Paul. "It was a bolder grain. So I think from that you can see, okay, well on my farm, in this season, Mayflower probably works quite well."

Rather than providing a definitive answer about which variety is 'best', Paul says that's exactly why

mixtures interest him. Performance is specific to the farm, soil and season – and the experience has prompted him to consider increasing Mayflower's proportion in the blend.

That same desire to spread risk is increasingly visible between species too. Winter wheat has traditionally been drilled with beans, which remain through the winter before being grazed by sheep in spring. Paul says grazing has achieved around a 99% kill of the companion, while the approach also brings diversity and potential disease suppression.

NITROGEN FIXATION

OSR is grown with vetch, which Paul separates after harvest. Alongside a

typical farm OSR yield of around 4.9t/ha, he says the system can produce a further 0.6-1.2t/ha of vetch seed. "You get the extra nitrogen fixation from the vetch, which is great, and you get the seed and the diversity in the field."

Even two crops which struggle to excite him economically – beans and oats – have become an opportunity to ask whether putting them together can make both work harder. "The oats are weed suppressants. So I wanted to grow beans without having to actually spray them because we end up with an open canopy and it's all weedy and messy. It could eventually offer a route into growing beans within the organic system too."

Perhaps the fullest expression of that thinking is Paul's seven-way polycrop of wheat, barley, oats, triticale, peas, vetch and rye. "It began as wholecrop for the neighbouring dairy business whose replacement heifers we rear. Straight

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Taking care of the soils

The farm is also experimenting with soil biology, using a microscope to monitor applied microbes – a process which has reinforced the importance of feeding what's already there.

spring barley had previously performed well, but increasingly dry springs made its performance less reliable,” he explains. “Adding peas produced an uplift, encouraging us to widen the mixture further.”

And after one of the driest growing seasons in recent memory, the performance of those more diverse crops has given Paul plenty to consider. His conventional wheat suffered along with much of the country’s crop, but the spring-sown einkorn actually yielded better than the previous season. “Those heritage wheats, they grow to about six foot tall and they root six foot deep. So that builds resilience.”

Cereal rye also performed strongly, while the organic polycrop looked remarkably similar to the previous season when Paul and his customer walked it ahead of wholecropping. “I think that diversity in the sward made it hold on a bit longer,” explains Paul. “It’s not as bad as it could have been had we grown monocrops.”

FUTURE PLANS

It’s already influencing plans for next season. Paul is considering growing peas alongside barley and wants to bring more legumes into the conventional rotation, while continuing to assess which crops and varieties appear capable of coping with a system where purchased inputs are deliberately being reduced.

Yet he’s conscious that genetics can only exploit what’s available beneath them, so for Paul, much of the next stage is therefore about creating a soil in which crops have the best possible opportunity to root, find water and access nutrients. “The main thing is trying to build organic matter in some fashion in the soil, because the more organic matter and humus there is, the more moisture your soil can hold,” he says. “I think your whole system has to be based around that.”

He’s also experimenting with soil biology, using a microscope to monitor applied microbes – a process which has reinforced the importance of feeding what’s already there. “I’ve seen that those microbes are live in the soil for days, but not weeks or months. So it’s about trying to feed them; I think organic matter is where it starts.”

That willingness to challenge convention has also brought Paul’s thinking on varieties almost full circle.

He explains that a friend recently gave him around 50 old jam jars containing ears of wheat and barley collected between the 1930s and 1950s.

“We’re now attempting to revive them, vernalising seed in the fridge before germinating and, if successful, multiplying it in the field. I’m really interested in what these genetics might offer having originated from farming systems without today’s crop protection programmes.

“It was all very much in rotation, mixed farms back then. So I think that’s what we need to go back to.”

For Paul, that doesn’t mean recreating farming as it was 80 years ago, but rather understanding what can be taken from those systems and made relevant today. Whether that’s greater genetic diversity, companion cropping, fewer inputs or simply allowing biology to do more of the work, the aim is to keep building resilience without adding unnecessary cost. And with a system that remains very much a work in progress, he says there’ll always be another idea to test.

“Ultimately for me, the future is all about being curious and just trying to find another way of doing things.” ●

“Some people are losing money, whereas we’re just making less.”



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Winter beans – the perfect fit

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Scoring a big break

"If in doubt, growers could consider diversifying some of their autumn break crop area with an alternative like winter linseed."

NIGEL PADBURY

With so much at play when choosing the right break for a cereal-based rotation, where do priorities currently lie and which crops are coming out on top? *CPM* asks its readers for their thoughts during one of the toughest harvests of modern times.

By Janine Adamson

One minute oilseed rape is on the floor, the next it's bouncing back like a phoenix from the flames... certain cropping options require specific environmental conditions to thrive, others particular equipment... and then there's the simply weird and wonderful.

While there's no magic one-size-fits-all break crop, broad trends can be identified, as demonstrated by a recent survey undertaken by *CPM* and Premium Crops. The questionnaire aimed to explore the aspects that shape crop selection, to help build a clearer picture of how UK arable businesses are making rotational decisions for the future.

Of those that responded, 87% of participants were growers, representing 40,000ha of the UK's farmed area. In terms of the results, firstly, and perhaps unsurprisingly, they suggest profitability and yield stability are the two most critical factors when it comes to deciding which

crops to grow (see chart 1). Conversely, sustainability and environmental benefits were deemed the least important.

According to Niab's Dr Lydia Smith, this is likely to have been compounded by two years of difficult conditions. "It's still very raw and returns have been mediocre at best, so of course yield and profit are most important. In fact, I'd have expected profitability to be even higher than it is depicted here in honesty," she says.

RETURN ON INVESTMENT

For Kent-based grower Eddie Henshaw, running a commercial business with 700ha of owned and contracted land, this inherently means that ideally, every crop has to deliver a profit. "Equally, pressure is increasing on growers to be more environmentally-mindful. But for many, we recognise we're the custodians of the rural landscape so naturally aim to protect it as part of all we do, far beyond

specific crop selection," he explains.

Running closely behind the economic factors in third place is 'rotational benefits'. This is probably the most obvious reason for growing a break crop, suggests Premium Crop's Nigel Padbury. "By definition, a first wheat isn't a first wheat if it doesn't follow a break crop. Whether it's



Rotational benefits

Whether it's soil structure, nutrient management, weed or pest control, break crops can bring benefits to a rotation that's difficult to measure in cash value, and it's good to see that recognised in the survey, says Premium Crops' Nigel Padbury.



Legumes

For Niab's Dr Lydia Smith, the survey results indicate a positive story for pulses.

soil structure, nutrient management, weed or pest control, break crops can and do bring benefits to the rotation that's difficult to measure in cash value and it's good to see that recognised in the survey."

Looking at selection drivers further, when asked to identify the greatest single influencer behind crop choice, 48% of participants said financial considerations, seconded by farm-specific constraints such as machinery, labour, soils (26%), followed by agronomic aspects (18%).

Equally, respondents were asked which sources most influence their choices, with agronomists ranking 75% followed by independent trials (63%) and field days (39%). Eddie agrees that his agronomist plays a pivotal role in decision-making.

"We have a long-term relationship and work closely together to devise an effective rotation whereby crops are targeted to the specific field and its soil type," he says. "However, I have to say that the market and available contracts also play a key part, to make sure the numbers stack up."

Diving into specific crops, respondents are firmly pointing towards OSR being back in favour, voting it the highest ranking winter-sown break crop. In fact, 67% of participants said they're planning to drill the crop this coming autumn, with 47% stating it's a consistent part of their rotation and will remain so.

Then, 26% of participants noted they're interested in returning to OSR, having grown the crop in the past (see chart 2). Nigel, who is also chair of the BSPB Minor Crops Group, says while encouraging, this may not translate to reality if conditions remain challenging.

This is because when asked the reasons behind why OSR no longer featured in rotations or was being phased out, 35% of respondents cited pest pressure while 25% said establishment reliability. "This summer's drought has persisted well into August leaving many growers wondering when they will be able to sow their OSR crops," raises Nigel.

CHALLENGES REMAIN

"In recent years the advice has been to sow before mid-August or after mid-September to avoid the peak of the Cabbage Stem Flea Beetle (CSFB) migration. For many parts of the country the dry conditions have ruled out the first of these options and, while the AHDB has recently updated its website with details of the autumn 2026 CSFB migration showing adult beetle numbers to be low, it's worth bearing in mind that the weather will also be influencing beetle behaviour.

"If in doubt, growers could consider diversifying some of their autumn break crop area with an alternative like winter linseed, that can be

drilled well into September and avoid the CSFB problem entirely."

Lydia believes that the numbers of growers returning to OSR are very high: "Given the disenchantment with OSR during the past few years, even with a recent U-turn in performance, I'm surprised to see it above winter barley (65%) in the intended plantings for autumn. I'd assume that there are areas in the North that haven't suffered the same way with establishment challenges.

"However, with appealing contract premiums available there's a chance the crop will return well, so it's understandable that it's featuring highly."

On the other side of the coin, when asked the reasons behind why OSR no longer featured in rotations or was being phased out, 35% of respondents cited pest pressure while 25% said establishment reliability.

Moving further down the popularity rankings and beans (33%) follow as the most popular winter-sown true break crop after OSR, with peas (10%) and linseed/flax (9%) coming in behind. For spring-sown break crops, peas come out on top (32%) followed by beans (21%) and sugar beet (17%).

For Lydia, this is a success story for pulses. "We know beans can struggle with establishment and don't like a cold, wet start but they're scoring well here. It's also exciting to see other pulses beginning to trickle through such as lentils and chickpeas, which although don't feature highly in this survey, are there."

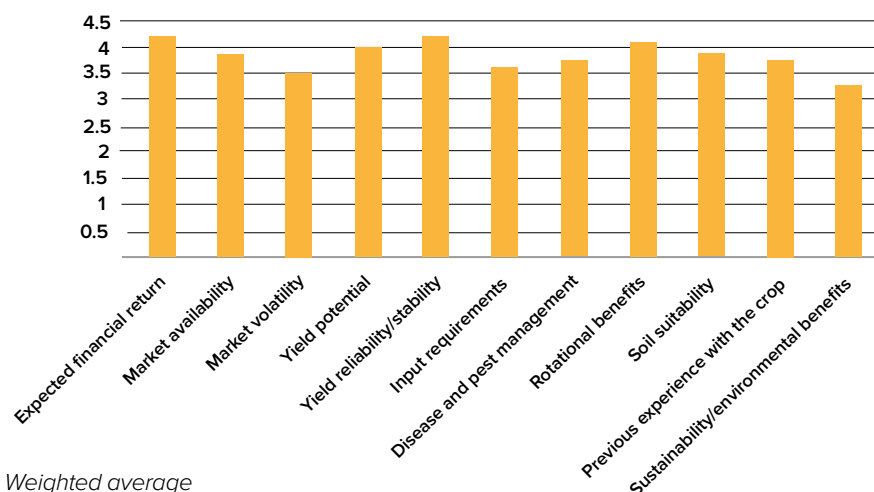
Another break crop increasing in popularity is linseed/flax. While just 5% said it's a consistent part of their rotation and will remain so, 16% said they were considering it for the future. "That's three times more than are currently growing the crop regularly, and shows the growing demand from farmers for another profitable break crop to diversify rotations," notes Nigel.

Eddie raises that linseed is a firm part of his farm's cropping rotation, having grown spring linseed for around 15 years as a replacement for OSR. With blackgrass pressure across the cropped area he says it's been a useful tool for reducing weed populations.

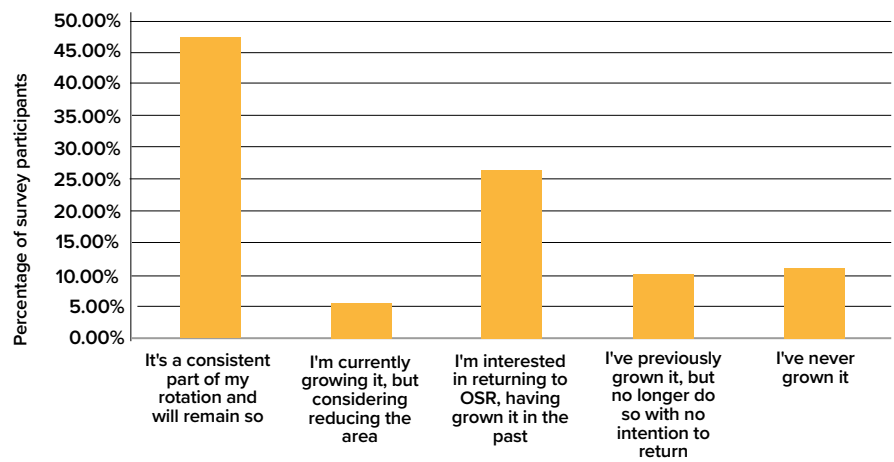
However, last year was his first foray with winter linseed, and despite the challenging season, he's been impressed with a 2.5t/ha yield average. Noting that in the survey some participants raised concerns regarding harvestability, Eddie says this hasn't been the case for him.

"I've heard growers in the past have

How important are the following factors when deciding which crops to grow? (1 = least important, 5 = most important)



Which statement best describes your current approach to oilseed rape?



had challenges at harvest, but for all time we've grown spring linseed, we've never had a problem as long as the combine has been smooth, full and flowing. Albeit for the winter-sown crop, I was a little concerned as it was the first crop in the machine this season, but that also passed through without any issues.

"Overall, the crop grew and established well and it was a learning curve for us. But it seems to have been a positive year for winter linseed across the country," he notes.

Lydia adds that while winter linseed/ flax can be perceived as risky due to it historically not being as frost tolerant compared with wheat and barley, with improved varieties coming through, this is gradually being mitigated.

"As for spring linseed, around 20 years ago there was plenty being grown due to the government incentives being



Winter linseed

Last year was Eddie Henshaw's first foray with winter linseed, and despite the challenging season, he says he's been impressed with a 2.5t/ha yield average.

offered. Once these disappeared, so did the area being grown. I think in view of its history and challenges, the quantity of growers considering the crop in this survey shows the great potential for under-utilised crops," she says.

Looking at the factors that would

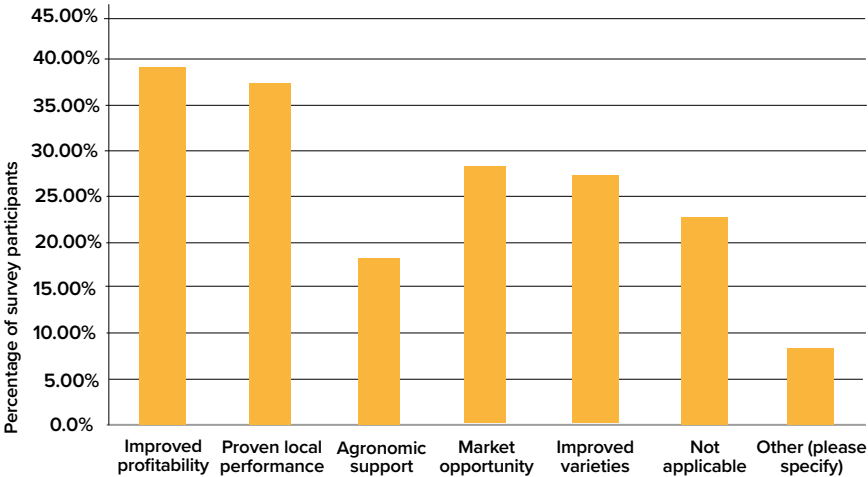
encourage more growers to take a chance on linseed or flax, and 39% said improved profitability, followed by proven local performance (37%) and market opportunities (28%).

Commenting on flax specifically, Lydia highlights that new harvesting equipment is being introduced from France that pulls rather than cuts the crop, laying it down flat for retting. "This is making a significant difference and is starting to make its way to the UK."

As part of the tie-breaker question, respondents were invited to answer the following: 'If you could introduce one new crop into your rotation, what would it be and why?'. Answers ranged from winter OSR, maize, linseed and forage crops, through to sunflowers, lupins, hemp and poppies. Some even stated money trees and simple, 'something profitable'.

For Eddie, he believes with an ever-buoyant equine market, there's potential in grass. "The public doesn't seem to reduce its spend on hobbies and leisure, so I think producing hay is quite a compelling option," he concludes.

What would make you more likely to grow linseed/flax? (select all that apply)



Winner announcement

Congratulations to prize winners Steve Bumstead, David Bell, Andrew Pitts and Nick Rowsell who responded to the CPM/ Premium Crops survey and provided insight on break crop choices, thus winning a £250 Amazon voucher each.

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Cup plant takes AD feedstock beyond maize



“As a flowering Asteraceae that closely resembles sunflower, its value to biodiversity is obvious.”

FIONA BEALE

Cup plant could make for a compelling alternative to maize on light soils or vulnerable sites, but requires more data to secure grower buy-in. *CPM* reports on the crop's potential.

By Andrew Watts

At between four and eight feet (1.2 - 2.4 metres) tall, cup plant (*Silphium perfoliatum*) is a sunflower-like perennial with coarse leaves. It's deeper rooting than maize, is often higher yielding on lighter soils, and its broad canopy architecture makes it more suitable for sites vulnerable to soil erosion. So why isn't it more popular among operators of anaerobic digestors?

It's simply that maize is better known; is an annual crop, which is often seen as an advantage, and both AD operators and contracted growers know what they're getting, believes Fiona Beale, independent seed merchant.

Having seen the popularity of cup plant in Germany, she decided to bring it to Great Britain. “For most AD operators, maize is the most profitable choice of feedstock and while cup plant's biogas yield is often less than

maize, it has a superior environmental profile,” highlights Fiona. “That means it warrants consideration, especially on drought-prone sites or those vulnerable to erosion and surface run-off.”

PERENNIAL PLANT

The most obvious advantage of cup plant is that unlike maize, it's perennial, meaning it doesn't require re-sowing each year, she adds. “Although not a new crop, it gained acceptance as a feedstock in Germany about 15 years ago where there's now roughly 10,000ha grown as a biogas crop, predominantly in the south. It's not uncommon to find crops sown in 2010-11 that are still producing today in fact.”

As with maize, good establishment is fundamental to success, as is weed control, explains Fiona. “Most growers chose to under-sow maize with cup plant to give a crop in the

first year. This also provides an opportunity to control weeds pre-emergence with pendimethalin.

“In year two, it'll yield about 80% of its potential before reaching 100% in the third year. Unfortunately crops sown three years ago in England have had to endure successive droughts which has slowed their growth and means some



Sow once to reap rewards

The most obvious advantage of cup plant is that unlike maize, it's perennial, meaning it doesn't require re-sowing each year, notes independent seed merchant, Fiona Beale.

ROTATIONS Alternative crops

► have yet to reach full potential,” she says.

The temptation is to compare cup plant’s output with that of maize grown on fertile soils, but Fiona says this is to misunderstand its appeal. Instead, its advantages are more practical and environmental.

“As a flowering Asteraceae that closely resembles sunflower, its value to biodiversity is obvious. It was its potential as a feed source for pollinators that helped to drive interest in Germany, as was its capacity to prevent soil erosion and surface run-off by promoting water infiltration. It’s also a winter-hardy crop, performs well in wet and dry seasons or on marginal or fertile soils.”

Interest among growers in Great Britain has so far been limited to biogas owner-operators rather than contract growers. This is partly due to the long-term commitment required, whereas maize production is often based on an annual arrangement. The seed costs too have served as disincentive, concedes Fiona.

“At roughly £2000/ha, the cost is similar to miscanthus, however it has the advantage of being a seed rather than a rhizome. We estimate that it

becomes cost neutral after five years.

“Other than weed control and the need for a molluscicide on heavier soils, the ongoing costs are minimal with nutrient requirements met through standard applications of farmyard manure or digestate depending on soil indices,” she says.

German experience suggests there are few disease or virus concerns either, although sowing immediately after oilseed rape is discouraged.

DRIVING UPTAKE

For Sean Quinn, feedstock adviser at Realistic Agri, while cup plant holds great appeal, he’s keen to emphasise that it should be seen as a complement to maize, ryegrass and wholecrop cereals, rather than a replacement.

“It’s the environmental and practical benefits that’ll drive uptake, especially on steep sites where there’s a risk of run-off, or on light soils where maize struggles to find enough moisture. I can also see it having appeal on soils high in phosphate and potash, typically indices of 4+, as a means of protecting groundwater,” he suggests.

There’s published data confirming



Complementary option

For Realistic Agri’s Sean Quinn, while cup plant holds great appeal, it should be seen as a complement to maize, ryegrass and wholecrop cereals, rather than a replacement.

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the benefits of cup plant in supporting earthworm populations too. A recent study from Germany published in the British Journal of Soil Science suggests significantly higher earthworm abundance, species diversity and richness in cup plant systems, likely because of the absence of tillage and the formation of a litter layer.

Having studied the published yield data, Sean estimates that cup plant could produce a biomethane yield that's roughly 90% of maize, but with the caveat that this is only a basic comparison as maize tends to be grown on better ground.

"Having looked at data from several sources, I estimate the yield potential of cup plant in the second year of establishment and harvested after flowering – typically late September as any earlier would make it difficult to ensile without wilting – to be about 15t dry matter/ha.

"Actual performance is of course site

dependant, with a range in the published literature varying from 12-20t DM/ha.

This equates to a fresh matter yield of 42-80t/ha at 25% DM. Consequently, biomethane yields range from 4250-6000 Nm³/ha, although some EU trials report up to 8000 Nm³/ha.

"Maize has a similar dry matter yield, typically averaging about 15t DM/ha,

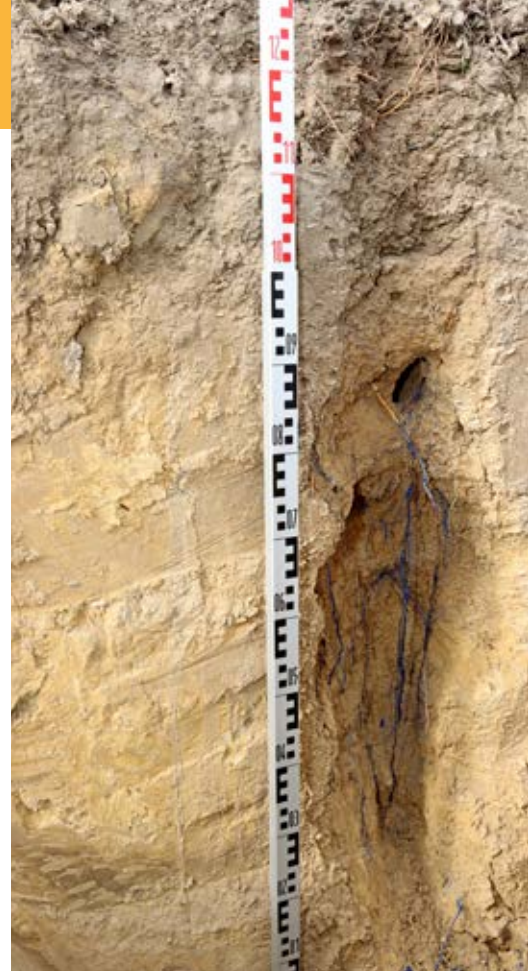
equivalent to about 50t FM at 30% DM, but is less variable as it tends to be grown on more favourable land. It's the biomethane yield of maize that gives it the edge at roughly 6000-10,000

Nm³/ha," he says.

As a perennial crop with a long lifespan, Fiona is keen to highlight its potential for carbon sequestration and the opportunities this may bring for additional revenue. "Estimates suggest cup plant sequesters about 8t Co₂/ha/year, which isn't to be overlooked, and it also holds great appeal as a stewardship cover crop.

"These opportunities are yet to be

"It's the greater root mass throughout the soil profile and to a greater depth that makes it better suited to less productive sites."



Deep rooting

Soil pit excavation showing the rooting depth of cup plant at roughly 130cm.

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► realised, partly because cup plant isn't on the official schedule of agricultural plants, but we're pressing the case with DEFRA, environmental bodies and water utilities," she says.

As part of efforts to promote the advantages of cup plant, Fiona is seeking funding from the Accelerating Development of Practices and Technologies (ADOPT) Fund, part of the UK Farming Innovation Programme. One of the conditions of this award is that cup plant is trialled in areas of the country where maize isn't typically grown.

"We have commercial crops across England and Wales from Kent in the south to Yorkshire in the north, but are looking for more marginal sites. We're also investigating companion cropping options as well as encouraging plant breeder RAGT to bring its herbicide-tolerant maize to the UK. This technology would allow the use of cycloxydim herbicide, thereby expanding the weed control options when maize is under-sown with cup plant."

For Dr Michael Dickeduisberg, head of renewable resources and crop production at the North-Rhine Westphalia (NRW) chamber of agriculture, and a grower of cup plant on his family farm, the crop reflects the expectations of German society.

"Maize is damaging to soils and field access can be challenging in both the autumn when it's harvested and the spring when it's sown. Cup plant overcomes these issues," he says.

Of equal importance is the role of cup plant in challenging some of the negative stereotypes associated with maize, he adds. "Roughly one-third of the maize grown in Germany is for biogas and the large area led to increased concern for the environment and biodiversity.

"Cup plant is great for butterflies, bees and other insects, and has been shown to reduce nitrate leaching – a serious problem in some regions."

It's potential to reduce groundwater pollution has attracted the interest of several water utilities with farmers in affected areas paid €500-600/ha/year to grow it. It's also one of few crops to have truly captured the attention of the Instagram generation.

Its a photogenic crop, and we see that many younger people enjoy taking photos of it for use on social media. We've found this to be a useful way of engaging the public about the purpose of energy crops," raises Michael.

It is on lighter soils, however, where



Under-sowing

Most growers chose to under-sow maize with cup plant to give a crop in the first year.

Photo: Michael Dickeduisberg

cup plant has found a ready home. "It's the greater root mass throughout the soil profile and to a greater depth that makes it better suited to less productive sites. Whereas maize roots stop at about 90cm, we've found cup plant roots down to 150cm. Critically, there's no evidence of damage to land drains through root ingress," he says.

Yield results reflect this observation – on sandy soils, cup plant out-yielded maize by roughly 40%, comments Michael.

Equally, trials conducted by the Julius-Kühn Institut and verified by trials managed by the NRW chamber of agriculture, investigated the autumn nitrogen content of the soil at three depths for maize, cup plant and ryegrass.

"In each autumn, the amount of nitrogen available to leach over the winter months was between a quarter and half of that seen with maize and close to that seen with grass, which underlines its value in reducing the risk of groundwater contamination," highlights Michael.

Then, a replicated plot trial conducted by the NRW chamber of agriculture investigated the impact on cup plant yield when sown with maize and sown solo, and the soil N-min after harvest. "The results were compelling. There was no significant impact on cup plant yield when sown under maize and the risk of nitrate leaching was far lower too," he concludes. ●

Supporting better decision making for BYDV control

"After all, any tool is useful above simply guessing."

ANDREW CRAGG

More than 30 years of research and development into how best to quantify the risk of barley yellow dwarf virus has culminated in the launch of a new web-based decision support tool. *CPM* takes a closer look...

By Janine Adamson

With growers reporting a significant increase in barley yellow dwarf virus (BYDV) symptoms in cereal crops this past season, some might argue that now would be the prime time to launch a new decision support tool.

And whether it's a happy coincidence or not, that's exactly what's happened, following the introduction of AHDB's new BYDV tool.

According to AHDB's Dr Sacha White, the loss of neonicotinoid seed treatments in 2018 left growers dealing with a problem that they'd not had to consider too concertedly. However, with relatively 'kind' conditions up until recently, it seems this past season has been the first year where the impact of the virus has truly been apparent for many.

"With neonicotinoid seed treatments, they offered up to eight weeks of

control of BYDV, so for many growers, it was an all-in solution. The knock-on effect of their revocation has been increased pressure on foliar sprays, namely pyrethroids, and subsequent resistance issues.

"For the two aphid vectors of BYDV in winter crops, work conducted by Rothamsted Research indicates there have been target-site mutations noted in some grain aphid samples, although bird cherry-oat aphid remains sensitive with no evidence of resistance."

RESISTANCE CONCERNS

"So the fear remains that without seed treatments, during conditions conducive to larger aphid populations such as this season, pyrethroid use may rise and thus increase the chemistry's vulnerability to resistance. If that happens, it leaves the industry with a big problem," he explains.

While the new tool from AHDB

was only launched in August, its development is rooted in work that took place around 30 years ago, adds Sacha.

"In 2018, the Game and Wildlife Conservation Trust undertook a one-year project funded by AHDB that involved reviewing existing decision support tools for BYDV,



Small yet significant gains

According to AHDB's Dr Sacha White, the new BYDV tool illustrates what relatively small shifts in drilling date can do.

- some which had been first created in the 1990s. This identified two potential contenders for the UK.

“These were then taken forward in a subsequent four-year project that began in 2019, and combined and developed to create what later became the ACroBAT model.”

It was during this project that a body of work was undertaken by ADAS to improve integrated pest management (IPM) approaches for aphid control and BYDV risk management. This resulted in two primary outcomes – improved monitoring, and, the test and development of ACroBAT.

“Regarding monitoring, a key finding was using molecular testing developed by Rothamsted Research to understand the percentage of aphids that actually carry the virus each autumn. This was a big step change because before, growers had to assume all aphids carry BYDV.

“Then for ACroBAT, this was tested in field trials and found to do a good job overall. It accurately predicted BYDV symptoms in surveys of untreated crops as well as being tested against the T-sum calculation. It was found that the ACroBAT model performed as well, if not better than T-sum, resulting in half as many insecticide sprays,” explains Sacha.

NEW TOOL

Fast forward to present day and the new AHDB BYDV tool has been revealed, built around a modernised version of ACroBAT. Web-based, it takes into account decades of aphid biology science, virus epidemiology and computer modelling, to deliver two key functions: risk-based spray decisions, and, indicating how drilling date affects BYDV risk.

Specifically, the tool uses regional data on bird cherry-oat aphid numbers and infectivity (historic and actual) from suction traps in GB (run by the Rothamsted Insect Survey) and NI (run by the Agri-Food and Biosciences Institute). This is then benchmarked against virus screens conducted over several autumns, which suggest about 20% of aphids carry BYDV on average.

ACroBAT was trained on the bird cherry-oat aphid because it's now known to be the most significant BYDV vector in the autumn and winter in most situations. Exceptions include crops that are sown very early or where there is poor green-bridge management, where

[Spray decision](#)
[Sow decision](#)
[Saved BYDV assessments](#)

Risk assessment inputs

[Spray decision](#)
[Sow decision](#)

Assesses BYDV risk to guide spray decisions. This tool is for use in BYDV-susceptible varieties

Field location * ⓘ

Search for a postcode or place, drop a pin on the map, or use your current position

[Use Map](#)
[Use Current Location](#)

Field surrounded by arable * ⓘ

Select whether the field is exclusively surrounded by other arable fields

☐ No

Sow/Emergence date *

Enter emergence date, if known, otherwise the tool will predict this using your sow date. Entering an emergence date will increase the accuracy of the tool

☒ Sow date
 ☐ Emergence date

Sow date *

Enter a date between 1 August and 15 January

Tool inputs

Field-specific inputs are required to run an assessment: field location, crop type, sowing date and whether the field is exclusively surrounded by arable land. Screenshot taken during development phase.

grain aphids can also be problematic.

Sacha says while ACroBAT in its original guise was effective, it wasn't particularly operator friendly. “So this year, ADAS undertook a project to develop a user interface that could be accessed, free-to-use, from the AHDB website, across devices,” he comments.

Dave Skirvin leads the development of models and tools for agro-ecosystem management at ADAS. Having worked on the AHDB BYDV tool this year he says finessing was required to ensure it'd perform effectively and reflect current growing conditions and production challenges.

“Recent updates include updating the five-year averages for both weather

parameters and aphid catches from the Rothamsted suction trap network, as well as reviewing all available data on aphid biology and reproduction. We've also converted the system to an API so that it can be web-based and accessed across various devices,” he explains. “There has been a lot of work behind the scenes to ensure this tool performs.”

Looking in further detail at the tool, specifically the spray assessment, this indicates the date when the next spray decision is required according to the economic threshold, which is the predicted point at which the economic loss due to reduced yield equals the treatment cost.

The tool includes default values for

average UK-cropping situations, which cover plant population density, expected yield and grain price, insecticide treatment cost and whether the farm is receiving Sustainable Farming Incentive (SFI) payments for not using insecticides.

Field-specific inputs are required to run an assessment: field location, crop type, sowing date and whether the field is exclusively surrounded by arable land, lists Dave. The defaults can also be changed by the user to make them field-specific.

The output is then a 'risk now' screen, which predicts infection impacts for several weeks, with the next seven days particularly critical for management, if the tool flags the risk as high. The output gives an option to view the effect of BYDV on yield and financial loss too.

"The tool allows users to see the result of spray decisions to date, alongside what would occur if an insecticide was sprayed at the next suggested decision point," explains Dave. "We have added spray persistence into the tool based on manufacturer data, to better represent the true impact of sprays on the aphid population."

As for the tool's sow-date assessment, this reveals how BYDV risk could change when crops are drilled earlier or later than the farm's standard target sowing date. Sacha believes this is important given the tool should be used in conjunction with the principles of IPM.

"It won't be groundbreaking news that the general advice is

the later you can sow, the better. But what this tool does, is illustrate what relatively small shifts in drilling date can do; there can be a substantial reduction in risk by delaying the sowing date by around one week or more."

As well as the work by ADAS, AHDB has also been liaising with farmer groups this year to gather feedback to ensure the tool is practical, intuitive and impactful. One grower involved was Kent-based Andrew Cragg, who farms 600ha of winter wheat, oilseed rape, spring wheat and peas.

He says because he drills the farm's wheat crops from mid-October onwards, mainly due to blackgrass pressure, this naturally reduces the risk of BYDV infection. However either way, he wouldn't want to gamble, therefore

applies insecticides if required.

"Winters are milder now and more growers seem to be being caught out by BYDV, equally, we've had patches of it in the past so know it's possible on the farm. I know this year has been a bad year for the virus, it's certainly in people's minds."

As such, Andrew believes it's timely for AHDB to launch a new tool. "Rather than a knee-jerk reaction to a bad BYDV year, we should be managing insecticide sprays effectively. I think the T-sum tool is highly regarded and shows the overall dynamics of aphid behaviour, but it doesn't really do the rest of the work.

"Actionable insights are missing – mainly the potential cost of the impact of BYDV. But with the new tool, the spray assessment particularly provides a much better view of the risks involved. Growers should definitely use it – after all, any tool is useful above simply guessing."

INTEGRATED APPROACH

While any new solution is undoubtedly exciting, Andrew urges growers to keep utilising the full suite of cultural controls.

"This is a tool to support decision-making and should always be grounded in the principles of IPM." Sacha echoes the sentiment: "Yes, the tool is helpful, but there are other non-chemical options to use including variety selection, managing the green bridge and keeping grassweeds under

control. We have a lot of confidence in the tool, but it has to be used as part of a broader suite of tactics."

Equally, Dave believes users should exercise a level of caution, mainly due to currently modest nationwide

"Hopefully this may reduce the quantity of insecticides being applied to crops and therefore mitigate risks associated with over-reliance on chemistry."



Farmer feedback

Kent grower Andrew Cragg was involved in the farmer groups that provided feedback to ensure the new tool is practical, intuitive and impactful.

coverage for the suction trap data. "The new tool is far better than the previous T-sum calculation, as it includes representation of both aphid and virus population dynamics. While we want the model to be used widely, it's important to be aware of its limitations.

"The new model tends to predict a much later first spray date than T-sum, and depending on drilling date and location, in some cases, no spray at all. Hopefully this may reduce the quantity of insecticides being applied to crops and therefore mitigate risks associated with over-reliance on chemistry."

Because the tool is the result of decades of research and development, of course, the work doesn't necessarily stop now. According to Sacha, the future may involve including varietal tolerance and resistance.

"With BYDV, there are so many moving parts that impact its significance, but the new tool should help to integrate a lot of those variables into one, to support more targeted control and better informed decision making," he concludes. ●

Research roundup

From Theory to Field is part of AHDB's delivery of knowledge exchange on grower-funded research projects. CPM would like to thank AHDB for its support and in providing privileged access to staff and others involved in helping to put these articles together.

For more information about this project and to use the tool, visit ahdb.org.uk/bydv



Ahead of the curve



“Ultimately, there’ll always be waste to get rid of.”

KEN HISCOCK

From helping to shape sprayer standards to developing a solution for pesticide waste that would ultimately travel around the world, Ken Hiscock’s career has spanned almost six decades of change in agricultural engineering. *CPM* traces the journey which led to the formation of WMEC.

By Charlotte Cunningham

Spend almost 60 years working in agricultural engineering and it’s perhaps inevitable that you’ll witness a fair amount of change. For Ken Hiscock though, a career which began in the late 1960s has meant doing rather more than simply watching it happen...

From the development of international spray nozzle colour coding and the early thinking behind routine sprayer testing, to finding practical ways of dealing with pesticide-contaminated wastewater, Ken’s working life has run alongside an enormous shift in how the industry approaches crop protection.

Today, accurate application, equipment testing and environmental stewardship are ingrained in professional spraying practice. But if you wind the clock back to the beginning of Ken’s career, much of that framework was still being built.

It’s a journey which has taken him from agricultural engineering college to pesticide application machinery – from training sprayer operators around the world to establishing a business whose wastewater treatment systems can now be found in more than 70 countries.

And while the scale of that journey might sound carefully mapped out in hindsight, its beginnings were considerably simpler, recalls Ken, fondly. “I come from a farming background; my father worked on farms, and that’s why I’ve always had an interest in farming and agriculture.”

That early connection led him to study agricultural engineering at Rycotewood College, alongside an apprenticeship with SCATS, before eventually joining Chichester-based agricultural engineering company E.

Allman & Co in the late 1960s. It was there that his career became closely entwined with pesticide application, initially in the UK and later internationally.

“I worked in various countries around the world, selling pesticide machines and training operatives on how to use them properly,” he says. “We also worked for



Six decades of change

With almost 60 years of agricultural experience under his belt, industry stalwart Ken Hiscock has seen more than most across his career.



The next generation

Ken's daughter Nicola Hiscock joined WMEC in 2002, initially in administration before progressing through the company, which she now leads.

a number of big chemical companies, making machines for them and training their operatives to make sure that the product was applied properly.”

As Ken's experience grew, so too did his involvement in the wider industry, eventually becoming chairman of the Agricultural Engineers Association's Pesticide Application Committee. The role connected UK manufacturers with work on European and international standards through BSI and ISO. Among the developments Ken was involved with was international colour coding for spray nozzles – something now so embedded in spraying practice it barely warrants a second thought.

Another was the principle of routinely testing sprayers. “I felt that as an industry we needed to make sure the machines being used on farms were being used correctly and were working properly,” he says.

The idea was essentially an ‘MOT’ for sprayers. Although not universally welcomed at the time, the principle eventually developed into the National Sprayer Testing Scheme. Long before environmental stewardship became the familiar phrase it is today, Ken's work was therefore already centred on ensuring crop protection products were handled accurately and responsibly.

However, by the late 1980s, another question was beginning to emerge. If increasingly close attention was being paid to how pesticides were applied, what happened to the contaminated water left behind when the machinery was washed out?

For one farmer in East Anglia, whose

land sat below sea level close to the Wash, it was a particularly pressing problem. Each time his crop sprayers were cleaned, the resulting washings presented a potential risk to the surrounding environment – and at the time there was no straightforward means of treating them on site, notes Ken.

Through ADAS and ICI Agrochemicals, Ken became involved in finding an answer. And despite the years of engineering expertise which had brought him to that point, the experiment which would eventually lead to the next chapter of his career started with something remarkably unsophisticated – a bucket. “The chemist who I grew to know very well always said that if it didn't work in a bucket, it wouldn't work on a farm,” recalls Ken. “So he took a bucket along, figured it out and it worked.”

SIMPLE BUT EFFECTIVE

The contaminated water was treated and the sample returned for analysis, confirming the chemistry had done its job. Further polishing with carbon could then bring the water back to a sufficiently high quality. It was a simple experiment, but one which would ultimately provide the foundations for the Sentinel treatment system and, several years later, Ken's own company WMEC.

Turning that bucket experiment into something capable of working reliably on farms was, unsurprisingly, rather more involved. Allman built several trial machines to turn the chemistry into a practical treatment system. What followed was around three years of testing and regulatory scrutiny. “We ran trials and they said, ‘No, we want to run some more trials,’ so we did,” says Ken.

Then the regulatory landscape changed, requiring another round of hoops to be jumped through. But eventually the trials generated a substantial bank of data demonstrating that the process could reliably treat dilute pesticide waste, he says.

Testing extended internationally through ICI's links, with work carried out in the US, Germany, Switzerland, Holland and India. For Ken, it prompted a significant career shift and he moved away from pesticide application machinery and into developing, manufacturing and marketing the technology which became known as Sentinel.

Its purpose was straightforward – rather than transporting large quantities of contaminated water elsewhere, treat the

waste at source, remove the contaminants and minimise the volume of concentrated residue requiring specialist disposal.

By the early 1990s, the owners of Allman decided to sell the part of the business in which Ken worked. Rather than walk away from what had been developed, he and a small group joined forces to take it forward themselves and as a result, WMEC was formed in 1994.

Ken soon discovered selling wastewater treatment equipment was rather different to buying a conventional item. “If you want to buy a washing machine, you can look at three or four, say ‘I'll buy that one’ and take it home,” he says. “If you want to buy a machine for treating waste, you have to go through a number of hoops.”

Environmental permissions and requirements surrounding the resulting water meant a sale could take a year or even 18 months. What's more, the UK interpretation of regulation also made the mobile treatment model Ken envisaged difficult to establish, despite it gaining traction elsewhere. “For example, in Belgium and Holland, co-operatives bought machines which travelled between farms and contractor sites treating waste,” he explains.

Closer to home, momentum built through research organisations undertaking pesticide trials, including ADAS facilities and the John Innes Centre, which required a means of dealing safely with waste containing



Foundations of a career

The Sentinel treatment system became the foundation of Ken's career and several years later, his own company WMEC.

► mixtures of experimental and existing chemistry. From there, the technology travelled further afield, into research facilities, agrochemical businesses and plant production sites in countries including Kenya, Ethiopia, Pakistan, India and the US.

In some cases, sites were alongside natural water sources, meaning treatment could allow contaminated water to be cleaned and reused rather than risking its return to the wider environment, notes Ken.

Applications broadened too, including work in French vineyards and the Champagne industry, and eventually into sectors including food production, laboratories and heavy industry.

But Ken's daughter, Nicola Hiscock, says the agricultural market itself took longer to catch up with the technology. "We've always been told we were about 25 years too early with the Sentinel," she says. "Everyone knew it worked and that it was the right thing to do, but it was difficult to get everybody on board to invest in it. But now, times are changing and legislation is tightening."

For Nicola, agriculture and wastewater treatment had been part of family life long before she officially joined WMEC. "I grew up going to the Allman factory with Dad as a nipper, so I grew up around the sprayer industry," she says.

Her childhood also included watching sheep dip waste being treated on farms – and the occasional sample making its way home. "I spent a lot of time watching sheep being dipped and then having waste tested on the kitchen table," she laughs.

Despite initially choosing a completely different career, Nicola eventually found herself drawn back to the environmental work she'd grown up around. She studied environmental sciences and joined WMEC in 2002, initially in administration before progressing through the company, which she now leads.

Today, some of the earliest Sentinel systems remain operational and WMEC says it has more than 1000 systems installed across more than 70 countries, collectively treating in excess of 1Bn litres of contaminated wastewater.

For a technology which began with a bucket, the scale is considerable and the type of waste being treated hasn't stood still either. One significant change Ken has witnessed is the evolution of pesticide formulation, with lower quantities of active ingredient accompanied by increasingly



Building momentum for waste treatment

Momentum for Ken's business built through research organisations undertaking pesticide trials, including ADAS facilities and the John Innes Centre, which required a means of dealing safely with waste containing mixtures of experimental and existing chemistry.

sophisticated surfactants, adjuvants and other components. "The chemistry has become better and better," he says. "Now we get less active ingredient and more secondary product – like adjuvants – than we did 10 years ago."

Although beneficial from an application perspective, those components still have to be dealt with when machinery is washed down. WMEC has therefore adapted its processes to handle changing waste streams, including high levels of surfactants and adjuvants.

CONCENTRATING CONTAMINANTS

Depending on the application, the Sentinel system can achieve removal efficiencies of up to 99.99%, concentrating contaminants into a much smaller volume for specialist disposal while allowing the majority of treated water to be managed on site and, where appropriate, reused. The same treatment experience is now being applied to emerging contaminants such as PFAS, with trials underway to understand how the technology can tackle an area attracting increasing scrutiny.

Yet despite enormous advances in application – from lower doses to precision and spot spraying – Nicola believes one basic fact remains. "Ultimately, there'll always be waste to get rid of," she says. "Farmers are going to become smarter in the way they work. There'll be more automation and they'll have to be more careful and savvy about the products they use, but they'll also have to be more careful and savvy about how they get rid of them."

Even highly targeted spraying leaves residues on sprayers and machinery which eventually have to

go somewhere, and with analytical techniques becoming increasingly capable of detecting contaminants in water, Ken believes scrutiny of those pathways will only increase. "We're better – we're realising that this water is contaminated and there's some organic waste from pesticides appearing in rivers. This will need looking at."

One possible solution brings Ken's thinking almost full circle. He says that mobile Sentinel systems could allow groups of farmers to share the capital cost, with each retaining the necessary infrastructure while a treatment unit travels between sites.

It's another practical answer to a practical problem – and perhaps that best sums up the thread running through Ken's career. Across almost six decades, the technology, chemistry and legislation surrounding crop protection have changed enormously. Yet the starting point has remained remarkably consistent – identify what isn't working, understand why and engineer a solution capable of functioning in the real world.

Today, WMEC remains in Chichester, where its systems are designed and manufactured, with Nicola leading the business and Ken having seen ideas once considered ahead of their time become part of an industry increasingly focused on demonstrating responsible pesticide use and disposal.

However, at 79, his attention doesn't appear to be solely fixed on what has already been achieved. There are new contaminants to understand, changing waste streams to tackle and further questions around water quality still to answer, he concludes. "That's what keeps me going. After all, there's always another problem waiting to be solved." ●



WITH MARTIN LINES

Nature NATTERS

To weed or not to weed?

Weeds can teach us about soil health, ecological balance and farm resilience.



“Is it time to take a fresh look at the plants we normally call ‘weeds’?”

Technically, a ‘weed’ is any plant growing in a location where it isn’t wanted by humans. There’s no botanical classification for a weed, it’s a human-defined term rather than a scientific plant family or species.

Any plant – even a valuable crop, a prized flower, or a beautiful native wildflower – becomes a weed if it grows where it interferes with human goals or outcompetes desired plants. Farmers’ tolerance for weeds in their fields varies hugely; we have those that are on the mower as soon as they possibly can to trim up any non-farmed area to make everything look neat and tidy. Weeds seen within a crop are targeted as enemy number one with all chemical or mechanical means needed to remove them.

And then we have the farmers who have a high tolerance for weeds, and encourage the additional diversity in and around their farms, who understand the benefits they bring outweigh the importance of neatness. We even have farmers who sow different plants together so nobody knows which is the weed and which isn’t!

Weeds can teach us about soil health, ecological balance and farm resilience. It’s often the weeds that thrive in challenging conditions – they act as nature’s diagnostic tool, telling us what’s happening beneath the surface.

Compacted soil often contains plants with deep taproots like dandelions, that tell us the ground is hard, dry, and lacks oxygen. Their roots help to break up this tight earth over time. High fertility areas of soil often have thick patches of stinging nettles, indicating that the soil is very rich in nitrogen and potassium. These are often seen where old manure or compost heaps have been.

On disturbed or bare earth, the very quick arrival of weeds shows nature’s urgent need to prevent erosion and cover the soil. Allowing these plants to spring up gives you a good indication of the type of seed-bank you have in your soil, and therefore what challenges you may face later in the year. Removing a seed-bank by allowing germination before planting a cash crop can certainly make life easier in the long run.

We must learn to see the ecological value of weeds, and rethink this dated assumption that these plants are nuisances to eradicate, because we didn’t put them there. Weeds do an

incredible amount to support the wider environment, and therefore our farmland and the crops within it.

Weeds are food for wildlife – many provide essential early nectar for bees, butterflies and other pollinators, before more domesticated or garden flowers appear. Providing a diversity of plants for pollinators can certainly support successful reproductive cycles, bridge ‘hungry gaps’, and even help mitigate weather impacts like this summer’s drought.

Unfortunately, many don’t understand the value of unmanaged, weedy areas for pollinators and other insects that we rely on to pollinate our crops and help manage pests, and therefore aren’t reaping the benefits of their ‘free’ support.

Our older generations valued the human use of many of these common yard plants like dandelions, clover, and purslane – after all, they are fully edible and packed with vitamins and minerals. And it’s not just the live plant that’s

beneficial – the minerals they contain nourish the soil when they break down, their decaying roots feeding soil microorganisms and creating tunnels for earthworms. Some innovative farmers are even using weeds to make ‘free’ fertiliser teas and brews to add to their soil.

It would be imprudent to rush to remove a free resource from our farms before we fully understand how they can support monitoring, forecasting, and the wider ecosystem that our businesses rely upon. ●

YOUR CORRESPONDENT

Martin Lines is an arable farmer and contractor in South Cambridgeshire with more than 500ha of arable land in his care. His special interest is in farm conservation management and demonstrating that farmers can profitably produce food in harmony with nature and the environment. He’s also chair of the Nature Friendly Farming Network UK. @LinesMartin martin.lines@nffn.org.uk.

Sharing the burden

“Remember you matter, push the button early if you need help and speak to us.”

STEVE JACKSON

A problem shared is a problem halved, but being able to talk about it in the first place is often the greatest battle. *CPM* explores the importance of being open to receiving help, and the positive impact this can have on mental wellbeing.

By Janine Adamson

Farmers – the epitome of ‘keep calm and carry on’... the proud custodians of the stiff upper lip... it’s nothing a plaster and some blue spray can’t solve...

But what if the problem isn’t physical? What if it’s something that can’t be escaped – the voices and feelings inside? According to the Farming Community Network (FCN) Staffordshire’s Steve Jackson, whether it’s physical or mental, many farmers only get help when the situation is at crisis point.

“Farmers are renowned for not really looking after themselves and are often very closed books. But actually, behind the thin veil of a smile, there’s so much going on that no one will know about,” he says. “They just keep going, but there always comes

a time when the tank is empty.”

Critically, he speaks from a place of experience. Steve is one of 400 national FCN volunteers, representing a charity that supports farmers and their families with both personal and business-related issues. The organisation runs a confidential helpline which is open daily from 7am-11pm with experienced volunteers on hand to listen and support. There’s also an e-helpline (farmwell.org).

KEY TOPICS

Steve raises that more than 2000 individuals connect with FCN every year, but broadly speaking, there are three key subjects that arise. “Problems tend to be financial, relationship or mental health-based, and the three can be very much interwoven,” he comments.

“But regardless, being able to unburden and unload to someone impartial can be a massive help, particularly during difficult times. Men in particular seem think it’s macho to not talk or show weakness, after all,



Masking emotion

Behind the thin veil of a smile, there’s so much going on that no one will know about, highlights FCN’s Steve Jackson.



Challenging times

Uncertainty makes everything so much more difficult, and farmers have that in many shapes and forms right now, raises YANA's Robin Hepburn.

'big boys don't cry'. But we have to get away from that myth," stresses Steve.

Calls to FCN are often from women as well as men, he notes. "Farmers endure brutal working hours and expectations are high; we receive calls from both male and female farmers and family members.

In some situations, women call the helpline because they say they feel they're having to cope as single mums due to their partner's long working hours. They're always giving so much yet can often feel very tired and isolated."

INTERVENTION

According to national statistics, around 40% of farmers say they are depressed at some point, yet despite this, the struggles continue, notes Steve. He stresses that while FCN provides help with a whole range of farming issues, it does have experience of engaging with individuals who feel they have no other place to turn and who are considering self-harm.

"We would rather intervene before that crisis point and would ask anyone to seek help as soon as they're feeling overwhelmed; push the button early if you need help and speak to us. We all understand farming and its challenges specifically. Our mantra is to listen, support and connect."

One reason why Steve believes farming is at a critical point, is that rural communities are shrinking with much less appreciation for farmers

as food producers and custodians of the land. "We've lost so much of the 'countryside community'. What used to be large teams of farm staff is now maybe one or two individuals who spend a great deal of their working life alone; rural isolation is a huge issue."

Conversely, he champions the power of resilience. "How can you get yourself so there's always something left in the tank and it's never fully depleted? Whether that's the business, finances or personal matters? We invite everyone to visit our Farmwell website, it's a resource for farming people and will help individuals and families to prepare and to cope with difficulties.

"It doesn't take much to fray around the edges, so we have to help each other through difficult times."

Robin Hepburn of YANA (You Are Not Alone) highlights that with so much unknown currently occurring in agriculture – the government's recent changes to inheritance tax being one example – there's a level of uncertainty at a broad scale. "Uncertainty makes everything so much more difficult, and farmers have that in many shapes and forms right now."

Drought funding now available

RABI has committed £2M of financial support for farming households affected by prolonged drought

RABI's emergency drought grant launched on 7 September, offering £2000 grants towards personal and household living costs for farm owners and tenant farmers whose household finances are under pressure.

With spring 2026 the warmest on record for both England and Wales, the grant is a response to increased financial pressures placed on farming households as a result of the impact of low spring rainfall and prolonged dry conditions through the summer.

Alicia Chivers, chief executive at RABI says the prolonged dry conditions are having a significant impact on farming people and households across England and Wales, with many facing increased financial pressure as the effects of the drought continue.

"I'm proud of RABI's ability to respond at pace when farming people face challenges on this scale. Through this £2M commitment, the emergency drought grant will

provide direct financial help to ensure farming people can afford to pay for core living costs during a time of increased stress and financial pressure. The charity's ability to respond at this scale is an important aspect of our work as the farmers charity.

"We know the impact of the drought varies across the country, which is why the grant applications will open in regional phases. I'd encourage eligible individuals to apply when the grant opens in their area."

RABI's drought grants are designed to provide flexible financial support for personal and household living costs, helping farming people manage day-to-day household expenses as autumn and winter approach. The grants can't be used directly for farm or business running costs.

South East opens on 21 September, East on 28 September and Midlands 5 October (*South West and West opened prior to this issue being printed*).



Emergency drought grant

This will provide direct financial help to ensure farming people can afford to pay for core living costs during a time of increased stress and financial pressure, explains RABI's Alicia Chivers.

For more information visit: rabi.org.uk/drought-support/

► Unlike FCN, YANA specialises in offering free confidential rural mental health support for those working across East Anglia. But like Steve, he says conversations can often be about relationships. “We find it’s issues that can’t be freely discussed at the kitchen table, and they rarely emerge alone, often accompanied by financial, family or business matters.

“For YANA, the topic doesn’t matter, we’re simply here to listen and provide some options. After all, most accept that when it comes to mental health, they can’t solve that alone.”

As a service, YANA offers a counsellor-trained helpline that operates 10am-2pm Monday to Friday, with a call back service for outside of those hours. There’s also a webmail facility.

“We aren’t a crisis line and would always urge those in desperate need to contact the Samaritans who are available 24/7. However, that’s an important point, you don’t have to be at breaking point to need to talk,” urges Robin.

FREE SUPPORT SESSIONS

For those interested, YANA can offer a triage service for up to 12 free counselling sessions with therapists who are rural specialists. That’s because every aspect of YANA is with agriculture in mind, stresses Robin.

“We don’t judge anyone, we’re simply concerned about those who may be in a dark place and feel they have no one who understands. We will listen and try to help; we are here holding out the hand of friendship.”

For Harper Adams University’s Terry Pickthall, mental health isn’t just about the negative, and should always be given a level of awareness, just like physical health. Having struggled in the past, particularly during the past decade, he’s keen to share his story in hope it encourages others to open up.

“For me, it’s been a lifelong issue, but has mostly been related to struggling with my workload and challenges that can arise in a busy workplace. It’d slowly build, and while I could deal with most of it in isolation, eventually, something small would tip me over the edge.

“Now, having been through a couple of phases where it reached the stage where I simply couldn’t function, I can

“We don’t judge anyone, we’re simply concerned about those who may be in a dark place and feel they have no one who understands.”



Talking therapy

Talking to a professional helps to analyse, unpack and re-prioritise what’s going on in Terry Pickthall’s life, he says.

recognise when I’m on that slide. I spot I’m feeling more anxious, perhaps I’m being more snappy at home, or struggling to make simple decisions.

“That’s when I know I need to make my situation more manageable, taking a step back to alleviate the pressure and re-prioritise my workload alongside my line manager. I appreciate that’s not

always possible if you have a farming business to run, but sometimes, you have to let the less critical aspects go. The world still turns,” he explains.

Terry acknowledges that his mental wellbeing is

something he’ll have to manage for the rest of his life, and can’t necessarily be fixed outright. “Feeling low can happen many times over, but it’s what you do about it that counts.

“I think with the current challenges facing British agriculture, it’s completely understandable that you might end up in a very dark place and feel there’s no way out.

“But there is so much support out

there, including specialist organisations like FCN, YANA and Yellow Wellies. In ways, these are better than the NHS for offering the right kind of support – they’re specifically trained and close to the farming sector, so able to signpost to the appropriate help for you.”

Now in a stronger place, Terry highlights that his preference was to seek help from his GP and engage in talking therapy. “When you go through a deep trauma, it leaves a scar even though you feel better on the face of it. Every day I’m reminded that I was really unwell and thought there was no way out, and I can beat myself up over that.

“Talking to a professional helps to analyse, unpack and re-prioritise what’s going on in my life. Mental health can be a rollercoaster and cyclical, which in itself can be so tiring, but it’s about recognising when you need support before it’s too late.”

To that end, he hopes that any stigma surrounding suicidal thoughts can be quashed. “I think those sorts of thoughts cross people’s minds more often than we might realise. But you won’t be locked up or sectioned, it’s okay to discuss that you’ve felt those emotions. Not talking about it at all is a far more concerning outcome,” he concludes. ●

Getting help

- Farming Community Network (FCN): fcn.org.uk ; 03000 111 999
- You Are Not Alone (YANA) for East Anglia: yanahelp.org ; 0300 323 0400
- RABI: rabi.org.uk ; 0800 188 4444
- RSABI for Scotland: rsabi.org.uk ; 0808 1234 555
- The Samaritans: samaritans.org ; 116 123



Mechanical weeding: the support crew

“We require a cohesive, industry-wide approach to change which includes promoting the value of mechanical methods.”

SAM SIEGLIN

As herbicide resistance concerns remain a ticking timebomb coupled with regulatory unknowns, could the answer lie in mechanical weed control? *CPM* explores what the future might look like, plus the machines being introduced to help make that a reality.

By Janine Adamson

While the likes of stale seedbeds, delayed drilling, competitive seed rates and cultivation choice all play a role in integrated weed management, according to Zürn’s Sam Sieglin, potential still remains in making more of mechanical methods.

And now, with a range of innovative equipment to address weed control at various points during a crop’s life cycle, he believes it’s time focus shifted towards finally realising what’s possible. “We need to understand what’s sensible and realistic. Yes weed control can be driven by politics and regulation, but globally we have very skilled agronomists; it’s about providing them with the best tools.

“This involves offering alternative

solutions that rather than replace plant protection products, support and help to protect them, so they remain effective both tomorrow and beyond,” he explains.

Sam believes that in terms of weed control, much education and industry messaging centres around herbicides and how to steward their best use. In contrast, knowledge about mechanical options remains niche, yet the topic presents a similar level of complexity that requires understanding.

SYSTEMS THINKING

“With mechanical weeding solutions, we’re not just selling a product, it’s a deeper application that’s part of a much broader system,” he raises.

For George Dance, UK sales

manager at Zürn, while eking out the final few percent of weed control using chemistry is extremely difficult, there’s potential to achieve that final uplift using mechanical methods. “But equally, the cost of mechanical weeding is never considered on a per/ha basis, while



Alternative thinking

Zürn’s Sam Sieglin points out that as nature and climate continue to shift, the same has to happen for weed management.

MACHINERY Future weed control



Removing survivors

According to Zürn's George Dance, that because the weeds targeted by the Top Cut Collect are 'survivors' post herbicide-applications, they're the most resistant and problematic weed populations.

for chemistry, that's widely accepted as the norm. There just isn't the same perception of value," he suggests.

He believes a positive step would

be to carefully and strategically use herbicides to mitigate the threat of resistance, supported by mechanical approaches. "I think this would be viable option for achieving a higher overall level of weed control."

Sam points out that as nature and climate continue to shift, the same has to happen for weed management. "Why should our

methods remain the same when everything else is changing?

"We have to diversify somewhat.

Yes this may involve investment in

"The Seed Terminator is a very powerful approach because it's controlling the most powerful, strongest survivors."

machinery in the first instance, but diversity across all aspects of crop production is important. As such, we require a cohesive, industry-wide approach to change which includes

promoting the value of mechanical methods. we have to evolve and shift together," he urges.

Looking at the options currently available, work begins in the autumn with stubble cultivation, notes Sam, although this can rely heavily on weather conditions. But then, once a crop is growing, innovation steps in. "Camera-guided hoes are a useful tool in cereal crops. Offered by our sister company Garford (see box), these effectively remove grassweeds before they mature."

MACHINERY INNOVATION

Later, once surviving grassweeds are visible above a crop in spring, this could be a time to deploy the Zürn Top Cut Collect, he suggests. "Using a horizontal cutterbar, this simply cuts, collects and removes tall weeds and grasses before they have the chance to return to the seed-bank.

"There's no other alternative tool that does this from a field hygiene perspective, for long-term weed control."

Because many weeds shed seeds before harvest, cutting off the seed heads and removing them from the field before the combine rolls is an effective method, adds Sam. "The practice has proven its worth throughout Europe over many years and has been confirmed by various scientific studies.

"Critically, the machine was driven from the field up using feedback from farmers. So in essence, they've developed their own solution. As it continues to grow in popularity, we keep undertaking technical improvements to ensure it performs at its best in the field."

In addition, George stresses that because the weeds targeted by the Top Cut Collect are 'survivors' post herbicide-applications, they're the



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most resistant and problematic weed populations. “They’re the plants that you must tackle for long-term effective weed control. They’re non-negotiable.”

Closing the loop is the Zürn Seed Terminator, an integrated attachment for combine harvesters that kills weed seeds during the combining pass. It works by terminating the germination capacity of weed seeds with up to 99% kill rate, reducing spread and dramatically improving in-field hygiene.

It’s centred around two high-performance multi-stage hammer mills which process the residue coming from the sieves, and can be used with John Deere, Claas, Case IH and New Holland combines.

For George, this helps to start the next season with a ‘clean’ slate and minimal seed return. “Again, the Seed Terminator is a very powerful approach because it’s controlling the most powerful, strongest survivors. This then loops immediately back to planting in the autumn; in essence these solutions collectively present a continuous cycle of weed management.”

While the Top Cut Collect is favoured by contractors, the Seed



Top Cut Collect

Using a horizontal cutterbar, the machine cuts, collects and removes tall weeds and grasses before they have the chance to return to the seed-bank.

Terminator is beginning to find a place on individual farms, he adds. “That said, take-up is still slow in the UK, while in Australia, growers there are further along in their adoption journey. It’s all about the commitment level and attitude to risk, and being able to see results year-on-year.”

Despite having the innovation now

available, Sam stresses that for weed control, it’s likely there’ll never be a silver bullet. “Equally we mustn’t block innovation or progression, or be scared of change. We have to try and meet in the middle, using patience and understanding. After all it’s not experimental rocket science, it’s proven,” he concludes. ●



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PÖTTINGER

Farming with reduced chemicals

How an electric weeder could power the future of sustainable crop systems

As pressure grows on farmers to reduce chemical inputs and adopt more sustainable production methods, mechanical and non-chemical weed control is becoming central to modern farming, believes Garford Farm Machinery.

For the firm, this involves a range of precision weed control technologies designed to help growers lower herbicide reliance, reduce costs and support 'cleaner' farming systems aligned with regenerative and organic principles.

Known as the Robocrop range, this

includes precision-guided hoes, in-row weeders, camera-guided cultivation systems and the latest innovation – the Robocrop Electric Weeder. These tools are particularly effective in high-value root crops, as well as vegetable, salad and brassica crops, where weed competition can have a major impact on production quality and profitability, notes Jonathan Henry, managing director of Garford Farm Machinery.

For the Robocrop Electric Weeder, this was developed in partnership with RootWave, and uses high-voltage, high-frequency electricity to



Robocrop Electric Weeder

The technology uses electricity to boil weeds and their roots, providing better weed control at a lower cost than chemical herbicides.

destroy weeds without chemicals. Electricity passes through the weed plant and into the soil, destroying the plant internally and killing the root system as well as top growth. Unlike conventional top cutting or contact herbicides, the treatment is systemic, reducing the likelihood of regrowth.

"We're using physics rather than chemistry," says Jonathan. "The technology uses electricity to boil weeds and their roots, providing better weed control at a lower cost than chemical herbicides."

Furthermore, the system works with minimal soil disturbance, helping to preserve soil structure, moisture retention and biological activity. Critically, testing has shown no negative impact on soil biology, making the technology suitable for both organic and conventional farms seeking to reduce agrochemical dependence, suggests Jonathan.

Beyond this, Garford's camera-guided systems can support harvest weed seed destruction strategies and top cutting applications by allowing growers to accurately target weed escapes before seed return becomes a problem. Precision guidance enables hoes and electric treatment systems to work close to crops with minimal damage, improving weed control efficacy while reducing labour and chemical costs.

Cost-effectiveness is another major advantage, raises Jonathan. "We estimate operating costs for electric weeding at £55-120/ha, potentially lower than conventional herbicide programmes, particularly as resistance issues and tightening chemical regulations increase.

"For many growers, especially those producing high-value crops, reducing spray applications while improving sustainability offers both financial and environmental benefits for the future of farming," he concludes.

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Efficiency over capacity



“Before we make any change to our system that involves significant investment, we have to know it’ll make us more efficient without incurring greater cost elsewhere.”

CLIVE WREATHALL

One Kent farm has replaced its combine, the largest model in the New Holland range when purchased, with the second biggest in the brand’s new flagship line. *CPM* visited to learn why the highest output option wasn’t the choice this time around.

By Martin Rickatson

When a new flagship machine is launched, the focus is inevitably on its statistics and how far it takes the numbers at the top of the table to a new level. But of course, while farms are growing larger, not every business requires or wants additional capacity. Instead, the desire for greater efficiency often drives an upgrade.

That was the case when Kent farmers JP Wreathall and Sons replaced their

combine, moving from what had been the largest in the New Holland range to the second largest in the new generation of flagship CR Twin Rotor models.

While the price of a newer model is always higher than the one it replaces, the desire to keep kit up to date but systems simple is driven by the desire to keep costs low and efficiency high, says Clive Wreathall. Alongside a Christmas turkey enterprise, he and his brother Andrew farm 1200ha of



Balancing act

Clive Wreathall notes that there’s a point where a certain level of extra harvesting capacity would mean having to alter other parts of the farm’s system. ►

wheat, barley, oilseed rape and peas.

“As a tenanted farm, we have to make a decent margin before accounting for our rent, and aim to minimise costs while only spending where necessary,” says Clive.

“We’re not averse to technology, but have to see a prompt return. For crop establishment, we’ve used the same system for 25 years, based on a Simba SLD disc/tine/disc/press cultivator and Simba Freeflow drill, and for power we run simple but high-output articulated tractors – currently a Case IH Quadtrac 620 and a dual-wheeled New Holland T9.600.

“Our soils here on Romney Marsh retain moisture and yield well consistently, and we find this establishment process gets the best from them, so we don’t tend to mess with it. We keep things simple: combine and work the land in good conditions, drill at the right time into a good seedbed, get our pre-ems on in good time and our nutrition right.

“Before we make any change to our system that involves significant investment, we have to know it’ll make us more efficient without incurring greater cost elsewhere,” he comments.

This philosophy has been behind the most recent change to the farm’s machinery fleet. Previously, the Wreathalls ran the largest combine then available from New Holland – a 2017 653hp CR10.90 with twin 2.6m-long rotors and 14,500-litre grain tank. Since then, the maker has released two new models sitting above this – the CR10 and CR11, both offering more capacity than the former flagship in terms of separation area and tank capacity.

“Being able to cut more per hour when the moisture is right minimises drying costs and helps preserve milling quality, which is great, but there’s a point where a certain level of extra harvesting capacity would mean having to alter other parts of our system – our grain trailers, for example. And, of course, the larger the machine the smaller the second hand market for it,” points out Clive.

So when the CR10.90 came due for renewal, rather than take a big step up to the new flagship New Holland CR11 combine, the Wreathalls chose its slightly smaller CR10 sibling, giving them a performance upgrade but without having to restructure aspects like their haulage system.

Technically-speaking, the CR10 gives



Mega boost

Everything with the CR10 is bigger – larger rotors, much larger sieve area and more grain tank volume – and that additional capacity makes the difference, says Nick Burrows.

the same longer 3.6m rotors as the CR11, and the same larger 8.7m² sieve area compared with the CR10.90’s 6.5m².

“With the CR11, though, the grain tank is about one-third larger at 20,000 litres, whereas with the CR10 we get another 1500 litres, at 16,000 litres, making a tankful still a good fit for our existing grain trailers without having to upgrade them as well, or swamp our grain store.

“At 635hp, it’s pretty much the same as the CR10.90, which is plenty adequate for our mostly flat land. And as we swath most of our straw we don’t particularly need the extra 140hp of the CR11 for chopping. The combine produces decent baling straw, despite the fact it’s a rotary and the straw passes through the chopper at low speed even when swathing,” he explains Clive.

Having stayed with a New Holland CR, he says he hasn’t found a design that’s any better, benefiting from added support from both the manufacturer and the dealer, Haynes. “As this was one of the first of the CR10/11s sold here, we’ve also received support from the Belgian factory engineers.

“Plus something else that’s really helped us to maximise output is the

12m MacDon FlexDraper header. It’s been transformational and I wouldn’t have anything else now. We purchased it when running the CR10.90, which it worked for one season before we sold that combine but retained the header. I reckon its ability to feed crop into the elevator heads-first – and lift flat crop when needed – has boosted output by 15%.”

Operator Nick Burrows joined the team in 2024 – the year Clive chose to focus on general harvest management and give up the combine seat. While this was Nick’s first season on the CR10, experience of a CR10.90 on his previous farm has given him good grounds for comparison.

“Although it was in the same county, it was on very different land,” says Nick. “In the perfect conditions we’ve mostly had this season, I’d say there wasn’t much of a noticeable difference, but where things were tougher and perhaps the straw was still green, I could really push on. Everything is just bigger – larger rotors, much larger sieve area and more grain tank volume – and that additional capacity makes the difference.”

The combine’s capacity limit is



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MACHINERY Combines

► something Nick believes he hasn't yet found, although he has once tested it via another new feature. From the elevator, the crop is fed to New Holland's Dynamic Feed Roll (DFR) system, which can now be reversed simultaneously with the elevator and the rotors. This works well without leaving the seat confirms Nick, having just once experienced a blockage that was rapidly regurgitated.

The DFR accelerates the crop and splits it to feed the two broader, longer 3.6m threshing and separating rotors. Each features 40 standard rasp bars and 12 spiked units, interspersed by eight HX hybrid raspbars. A greater sidewall angle helps accelerate crop flow in the stepped rotor cage, between the threshing zone and separation zones.

Vane angle is adjustable from the cab to vary threshing intensity, while new rotor cages feature a stepped design with broader cage and higher vanes in the separation area, for greater crop mat movement and improved separation. There are two sets of three lightweight threshing concaves and separation grates, and two sets of six lightweight grates.

A new TwinClean cleaning shoe comprises two sequential sieve systems, each with its own upper and lower sieve and clean grain auger, and is based around a large grainpan with an increased fallstep to the first upper sieve. Two automatic cross distribution mechanisms, one on the grainpan and one on the upper sieves, are designed to ensure an even cleaning shoe load.

Then, pressure sensors on the grainpan and on the upper sieves continuously measure cleaning shoe load to address any material distribution left/right anomalies. Lateral movement of the grainpan and sieves evens material over the cleaning shoe's full width, with the cleaning shoe compensating for uneven feeding and side slopes up to 28%.

While the CR11 retains the CR10.90's 15.9-litre engine but boosts power to 775hp, the CR10's powerplant is actually a smaller displacement 12.9-litre unit, but producing just a shade less power, than the CR10.90, at 635hp versus 653hp.

In the CR10/11 the engine sits longitudinally, which New Holland says minimises power losses. Harvesting engine speed is 1900rpm, versus the CR10.90's 2100rpm, reducing fuel consumption and noise, complemented by a 1300rpm engine

speed at maximum travel rate.

"There's plenty of power for our situation, so I don't think the small difference is noticeable," says Nick. "And while the combine is physically bigger because of the longer rotors, it turns tighter – I can easily get round on a four-pass headland.

"The adjustable ratio steering New Holland offers on its tractors would be a nice addition though; steering a combine this size can be quite heavy, and it requires about five spins lock to lock." Other cab features come in for praise, including a redesigned armrest and the new IntelliView 12 touchscreen, rated easier to use than its predecessor. It also has the IntelliSense system, which automates threshing, separation and cleaning shoe settings according to whether the operator wants to maximise throughput, minimise losses, optimise grain quality or work to a consistent fixed throughput.

"It's a good system, altering settings continuously as conditions change, but we prefer to set and alter things manually," highlights Nick.

Given that the Wreathalls' CR10 was one of the UK's first, there was a fair amount of initial scrutiny from both dealer and manufacturer, and it's benefited from a number of subsequent upgrades now featuring on current machines.

"It had about a week's post-harvest

attention, beefing up the intake fan housing, changing a radiator seal and replacing a rotor gearbox," explains Nick. "The chaff spreaders were modified and received new radar sensors to distribute more evenly and address ridging on the outsides in OSR residue. And the unloading auger extension was removed, as we'd found it unnecessary for this 12m header, and it had meant the tractor/trailer were travelling on a straw swath.

"We'd also found the air intake beneath the combine for the internal fan was occasionally blocking with straw and chaff, and New Holland also modified this to address the issue."

Aside from those niggles, he believes it's a good machine. "Its internals seem more than matched to keeping up with what's put in front of it, and there are other handy features such as the ability to shut off the cross augers to fully empty the unloading auger.

"But it's also easy to maintain. Sealed bearings aren't perfect – we've had one go on the elevator – but I like that there are no daily service points. There's a 100-hour grease point on one of the main left-side pulleys, plus a couple on the front axle at the same timing, and little else that needs attention short-term. It takes longer to service the header, but for what that adds to the whole combine package that's time well spent," he concludes. ● ►



MacDon FlexDraper header

The farm's 12m MacDon FlexDraper header was retained for the CR10 when the previous CR10.90 was sold.

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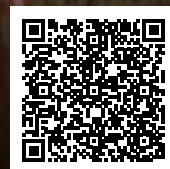
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CASE IH

New in combines

The latest additions to the marketplace for harvest

Fendt / Massey Ferguson

Fendt and Massey Ferguson have increased the cleaning capacity and separation area of the latest Ideal combines. The new CyclonePlus cleaning system has a redesigned pre-sieve with 1m² of concave area, 8% wider sieves and revised airflow concept, changes said to collectively increase cleaning capacity by around 25%. An optional slope performance kit optimises crop distribution on the top sieve when on side slopes.

Finger separation grates replace blanking plates on the Helix processor in the Ideal 8 and 9, boosting respective total separation area by 27% and 12%, while all four Ideal models now share the same rotor configuration. Meanwhile, a new standard radiator for the MotionShift transmission improves

oil cooling performance during road travel and on steep gradients.

Case IH

Updates for the entry-level 160 series Case IH Axial-Flow combines build on the 2024 launch of the models, when Case IH introduced its Harvest Command combine automation from its 260 series into the 6/7160.

Dual customisable Pro 1200 touchscreens now simultaneously display machine and field data. Remote display viewing allows managers and – with permission – dealers to monitor machines and assist operators in real-time. A new Vector Pro receiver enhances guidance accuracy, while Connectivity Included provides connectivity for the combine modem lifetime without fees. AccuSync provides real-time data-sharing between multiple

machines, and AccuTurn enables automated headland turning.

A new cross-auger clutch allows the unloading auger to be fully emptied, while a two-speed feeder drive option aids crop flow across varying conditions, and a new concave configuration improves performance in high-moisture crops.

Claas

Among combine developments for the coming season, Claas now offers a 15.3m Convio Flex 1530 draper header for its largest Lexion models.

Established in North America and Australia, it has suspended wheels, a flexible knife and infinitely-adjustable Active Float contact pressure. In 'Flex' mode, the knife automatically adapts to ground contours by up to 90mm upwards and 135mm downwards.

Like the existing Convio

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THE FARM MACHINERY MAGAZINE



Exclusive: John Deere launches new 6M 220 with E19 transmission

The engineering team at John Deere deserves a round of applause. The new, fully automatic E19 transmission is largely based on the PowerQuad, which has proven itself thousands of times over. Read our exclusive first drive [here](#) or in the next issue, published on 26th June.

[MORE](#)



Kuhn unveils new Karan sprayer

Kuhn will debut its high-capacity Karan trailed sprayer alongside several other updated products aimed at arable farmers and contractors. The mid-range Karan Power 8000 model will have 36m aluminium booms and a 6,000-litre capacity tank.

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MACHINERY Combines

John Deere now also offers a 15m header – 15.2m to be precise – for its flagship X9 combines, plus larger 19,400-litre grain tank and 10.7m unloading auger options.



- Flex 1380, there are two lateral delivery belts and a central feeder belt, plus a two-section knife. The suspended reel is split into three.

Also new from Claas is Nutrimeter Grain, an NIR sensor for real-time and recorded yield and mapping of grain and oilseed nutrients, using a transmissive

method measuring through the seed rather than just its surface. A small amount of crop is taken continuously from the elevator for grain protein or oil content analysis, with values displayed on the in-cab CEBIS terminal and transferred to the online CLAAS connect portal.

Crop of different values can be separated, and field

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VÄDERSTAD

Where farming starts



Developments from Claas for 2027 include a 15.3m Convio Flex 1530 draper header for its largest Lexion models, and a nutrient analysis system.

areas of different quality subsequently treated appropriately with varied nutrition for the following season. Cost is believed to be half that of NIR devices previously available. A one-off licence fee for the related combine is required.

John Deere

Established on its rotary models, predictive ground speed automation now features on 2027 John Deere T5/T6 walker combines, controlling ground speed based on crop height and biomass measurements taken pre-harvest from satellite scans, and in real time from a cab-mounted camera monitoring areas such as laid crop or dense weed patches.

An operator-defined crop throughput target is an additional automation setting, linking ground speed with grain quality to allow more dynamic speed adjustments to keep grain loss within acceptable limits.

Active slope adjustment is now optional on S7 rotary combines. Using

terrain data from the StarFire receiver, this automatically adjusts active belt speed to level crop flow to the cleaning shoe on side slopes, which Deere says effectively doubles cleaning shoe performance without compromising grain quality or capacity. There are also now four S7 sidehill configurations, including a sidehill kit, active slope adjustment and HillMaster.

Flagship X9 combines are now available with a new 15.2m/50ft HDX 50 header, plus larger 19,400-litre grain tank and 10.7m unloading auger options. Updated Tru Thresh concaves simplify crop changeovers, for instance through concave and separator cover control from the cab.

An automatic guidance system for the tractor/trailer during unloading is now available on S9 and X9 models. Meanwhile, Deere's Harvest Settings Automation now includes settings for more crops including oats, triticale, rye and peas.



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A fine balancing act



"It's not an easy situation, and there's a risk that we could lose potential from the slurry from a farming point of view and risk run-off."

HARRY HENDERSON

After months of drought, the return of rain may be welcome, but it brings a new set of considerations for growers looking to make the most of organic manures ahead of autumn drilling. *CPM* explores how careful timing, planning and application could help turn a challenging window into a valuable nutrient opportunity.

By Charlotte Cunningham

After one of the driest summers in recent memory, the sound of rain hitting shed roofs and the forgotten sight of puddles in yards has been welcomed across much of the country.

But while the change in weather may finally offer some respite for parched soils, for growers preparing to spread slurry and farmyard manure onto stubbles, the transition from one extreme to another creates something of a conundrum.

Apply onto ground that remains baked hard and slurry may sit on the surface rather than infiltrate, but wait too long and continued rainfall could quickly leave soils vulnerable to compaction, damage and nutrient run-off – all while the autumn drilling window edges closer.

This is according to BASIS' Harry Henderson, who says this challenge

makes the coming weeks something of a fine balancing act. "Farmers have to consider that there's some rain coming to wash some slurries in, rather than let it sit on the soil surface," he says. "But then again, there's always that risk where we've seen before in past years, where in mid-September it starts raining and doesn't really stop, and then you're in a bigger situation where you have poor ground conditions and risk of run-off even more so."

BEING PREPARED

Consequently, rather than simply waiting for the perfect opportunity, Harry believes this autumn is about having a plan and being prepared to act when conditions allow. For him, that means assessing fields individually and working out where the spreading window is likely to close first.



Careful planning required

BASIS' Harry Henderson says that when planning to apply muck or slurry, soil type, drainage, topography and current ground conditions should all feed into the decision.

“Soil type, drainage, topography and current ground conditions should all feed into the decision, with those most vulnerable to deteriorating conditions pushed towards the front of the queue,” he advises. “Identify fields that you’re going to use, consider how quickly the field conditions could degrade, and get the poorest draining or the lowest lying fields identified first to receive manures and slurries, because the conditions could change quite quickly.”

He adds that it’s almost like prioritising harvest. “Know the fields that you need to deal with first, and have a plan.”

That field-by-field approach is particularly pertinent after the prolonged dry spell, and although recent rainfall should begin to soften ground, Harry says growers shouldn’t underestimate the potential for run-off where intense rain falls onto soils which remain hard and unable to readily absorb water. “There’s a risk of run-off on hard soils and torrential downfalls. That’s probably more so with slurry, that’s a bit more potent than FYM.

“I think we are where we are. It’s not an easy situation, and there’s a risk that we could lose potential from the slurry from a

farming point of view and risk run-off on particularly hard fields and on slopes.”

NUANCES

The distinction between slurry and FYM is important, he adds. Whereas slurry requires particularly careful consideration because of its ability to move across the soil surface, FYM may offer greater flexibility where ground conditions remain suitable for travelling.

That said, making the most of either starts with understanding exactly what’s being applied, he notes. “I think you always need to know what you’re applying from a farming and plant nutrition point of view, and from a regulation perspective, that you have yourself covered and know what you’re applying.”

Analysis can therefore help growers to understand both nutrient content and appropriate application rates, particularly where manures or digestates are being imported onto an arable unit, he advises.

However, for Harry, there’s a bigger opportunity at stake than simply finding somewhere suitable to spread before drilling begins. With bought-in inputs remaining a significant cost



A two-stage process

Vogelsang’s Andy Hayhurst suggests thinking of post-harvest slurry management as a two-stage process rather than assuming everything has to be applied to bare stubble in one pass.

to arable businesses, he believes organic manures should increasingly be viewed as a nutrient resource capable of contributing to crop requirements – although he acknowledges there’s still work to do in changing attitudes.

“I think we still have some way to go before we really see it as a resource. I think we’re still thinking it’s a product to be disposed of rather than a product that could help reduce a synthetic fertiliser bill and help to reduce your carbon footprint.”

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MACHINERY Muck and slurry

► benefits, while slurry, digestate and other organic materials all have a potential role within a wider crop nutrition strategy. As such, Harry stresses the key to getting the most from these resources is putting a value on them. “Get a cup of coffee and do some analysis. Get the results in, sit in front of a computer and consider the fields that you know best, and work out a plan of utilising the slurries to their fullest value.

“Push yourself to make better use of it and better understand plant nutrition, and the end result is the reduction of your synthetic fertiliser bill.”

Once the nutrient value is understood, attention turns to getting as much of it into the soil – and ultimately the following crop – as possible. Vogelsang’s Andy Hayhurst says that’s especially important during warm post-harvest conditions, when poor storage and application can result in valuable nitrogen being lost.

He suggests thinking of post-harvest slurry management as a two-stage process rather than assuming everything has to be applied to bare stubble in one pass. Applying a proportion now can begin returning nutrients to the soil, while retaining some slurry for application once the following crop is established may allow growing plants to make greater use of those nutrients, he adds.

Slurry condition matters too and Andy says effective separation and covering stores can help to retain nutrients, while well-separated material is easier and cheaper to pump and lends itself to more accurate application through dribble bars or trailing shoes. The liquid fraction is also absorbed more readily, helping to reduce the potential for ammonia losses where warm conditions persist, he raises.

Matching application to individual fields is equally important. Different soil types have differing capacities to absorb slurry,

says Andy, making soil and slurry analysis, field mapping and – where available – variable rate application useful tools for matching applications more closely to requirements. This becomes particularly valuable if slurry is applied after establishment, where excessive volumes could swamp both soil and young plants.

NUTRIENT PLANNING

Harry continues that precision shouldn’t end when the tanker leaves the field. Where application technology is capable of monitoring slurry constituents or mapping application rates, he encourages growers to retain that information and use it within wider nutrient planning. “If there’s technology that can monitor either the slurry constituents or the application rates of FYM on a field mapping basis, get the maps.

“Look at the application rates. It’s always good to improve farm management and nutrient management, and it’s always good to be able to record what you do generally and build up a picture of your application rates.”

Where contractors are carrying out the work, growers should also discuss the application system available, with low-emission equipment such as dribble bars, trailing shoes or injection helping to reduce ammonia losses. Practical considerations shouldn’t be forgotten either, adds Harry – particularly as slurry equipment has become larger. “Access, gateways and bridge capacities all have to be considered before machinery arrives on farm,” he advises.

Ultimately though, this autumn may come down to timing and Andy says the ideal opportunity is neither the bone-dry conditions experienced through much of the summer, nor the heavy rainfall which has followed. Instead, the target



Challenging conditions

While the change in weather may finally offer some respite for parched soils, for growers preparing to spread slurry and farmyard manure onto stubbles, the transition from one extreme to another creates something of a conundrum.

should be cool, cloudy conditions after enough rainfall to improve soil absorption without leaving ground saturated.

But with autumn conditions capable of changing rapidly, Harry’s overriding message is to not wait until the spreading opportunity has already arrived before deciding what to do. That means knowing which fields are priorities, what nutrients are available, the rates required and whether soil conditions are capable of receiving them – then being ready to move.

It’s an approach which fits into a wider need to scrutinise autumn expenditure following another challenging season, he concludes. “All the businesses that a farm will buy from are hard-nosed businesses. All the businesses that you will sell to are hard-nosed businesses. It’s very high time to be the same.” ●

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WITH ANDREW WILSON

Talking TATIES

The end for sugar beet

“Knowing where to start with the positives of the 2026

summer beyond an easy harvest isn't particularly easy; the payback time for my dryer upgrade in 2025 has certainly extended.

When it comes to weeds, we have our share, in fact my agronomist declared a while ago that anyone who says they don't have grassweeds on their farm isn't looking hard enough. We're not plagued by excess amounts of any of them, because I view weed control like any other problem in farming – best dealt with while the issue is small. It's cheaper and easier that way, and there are more options.

We have a little blackgrass, canary grass and sterile brome, but we also have some soft or meadow brome, which require a different line of attack. This year though, time has been on our side, and in this instance, so has the weather. It's enabled a full month of undisturbed time for the seed to ripen on the soil surface before a light cultivation in order to get some green shoots on which to apply glyphosate.

We plough on an 'as required' basis, which is dictated by weeds present, time since last ploughed, and the type and time of the next crop to be sown. Importantly, never waste a ploughing – it's better not done if it can't be done well, such as our heavy

land in 2026 where we'd risk dispersing seeds throughout the soil profile rather than neatly laying them in the furrow bottom. Lighter land is less of an issue in this regard.

Fields are treated one by one because with nine different crops and several soil types, that's what works best. Wheat stubbles going into malting barley saw a very light cultivation a few weeks before ploughing in an effort to reduce both wheat volunteers and the odd wild oat. Bean, pea and oat stubbles were nicely cracked, so where the weed spectrum allowed, were cultivated to mix in residue and instigate a chit when rain arrived. Then, land going into spring barley from wheat has had some muck applied and cover crop sown into just enough cultivation to allow easier establishment next spring.

A dry time in beet is never much fun for anything except fat hen, but at least we've just about managed to keep beet moth and virus yellows out of what will be a shadow of last year's record crop. Yield prospects don't look promising, but it's picked up a bit since the rain restarted, so for all it'll be a disappointing last season for us, I don't think it will be a disaster.

Yes, I've searched my soul and crunched and recrunched the numbers, but with a best guess at the likely price we'll be paid after the arbitration process has concluded multiplied by my average yield, the result wasn't appealing. When York sugar factory closed in February 2007, our average yield was

about 75% of where it sits today, but the risks and challenges of growing the crop were much less.

In all honesty, it was the haulage side that was then a part of our business that played a part in supplying beet to Newark factory initially, although that ceased after the 2018/19 campaign. My father's farming diaries started in 1963 when he was 12 years old, and beet was clearly very much a part of the farm then, so we've had more than 60 years growing it without missing a year. It's sad to cease growing a crop that's slowly but consistently improved over the years (much more so than cereals) but I'd be foolish to ignore the economics for the sake of sentiment.

So on we go. I'm fortunate to have several options of break crops with local demand to choose from, but for 2027 at least, we venture back into oilseed rape which apart from a brief unsuccessful dabble four years ago, we've not grown since 2010. The why is important here; why didn't it work back then? Why do I think it'll be any different now? What was wrong, what was right, and how do I lessen the chance of an egg face next spring?

This where the collective experience of CPM comes in. After years and years of being a reader, there are a few things that stick in my head as being consistently positive: strategic muck, establishment, moisture, predator control and nutrition.

All have the same basic common denominator – attention to detail – and as a team, I feel that we are in a

better position to be up for the challenge now. Watch this space I guess... I do have some spring bean and spring oat seed sat in the shed if it all goes a bit pear shaped.

As I write this, we're on the cusp of topping a few potatoes which is a sobering and far less exciting prospect than that described above. Unirrigated determinate crops only justify the topper to close up a few ridge cracks to safeguard what's actually decent quality, even if the yield is nowhere near contract level.

Indeterminate crops have fared little better, but what's clear to see is the value of organic matter and manures of various kinds. Now is the time to do a few more digs, measure some experiments and seek out any solid improvements that can be put in place to increase our resilience and profit prospects in future seasons.

It's a good job I'm a stubborn old wotsit, because Dragons' Den would definitely be a full set of 'I'm out' for potato growers in the current climate. Happy lifting. ●

YOUR CORRESPONDENT

Andrew Wilson is a fourth-generation tenant of the Castle Howard Estate in North Yorkshire.

He has a strategic approach to direct drilling on his varied soil types and grows a wide variety of crops. He's passionate about the potato industry and having been utilising cover crops to reduce cultivation and chemical use since 2011, dipped his toe in the water of regenerative potatoes in 2021. @SpudSlingsby

Doing less brings more



“The amount of fuel you burn on the tractor often correlates with the amount of soil damage you do.”

DR MARK STALHAM

Shallower working that shifts less soil can bring significant benefits in terms of soil health, yet doesn't necessarily have to compromise production. CPM talks to a leading potato consultant for the lowdown.

By Mike Saul

While the somewhat ‘smash and grab’ approach to potato production may be counterintuitive to efforts applied to improve soil health in other crops in the rotation, there's plenty that can be done to minimise the impact without compromising yield, suggests potato consultant, Dr Mark Stalham.

Yes getting the crop into a well-formed ridge requires plenty of soil movement, but when it comes to cultivations, it's a case of doing so in the least intensive manner, he adds. This should include operating to a minimal depth, leaving as much of the soil untouched as possible and working the ground under

conditions and in a way that creates as much stability as possible.

Mark points out that trials using lower intensity destoning with shallower, faster, wider-pitch webs or stars, suggest it's possible to cut cultivation costs and speed the planting operation without compromising yield.

“All it takes is closer attention to detail, a willingness to try, and a change in mindset,” he raises. “And don't underestimate the role of the potato crop in the rotation where it's possible to correct structural issues created by reduced-tillage cereals.”

So, what's the ideal ridge for potato production? Quite simply, it's one with sufficient soil volume

to grow and contain the crop tubers with minimal greening, says Mark.

“With only 3-4% of ridge volume occupied by the tubers for typical yields, growers should ask themselves why they're shifting such large volumes of soil?”

Adequately sized ridges – with a 1100-1200cm² cross-section – can be formed from as little as 25cm of soil, even in moderately stony scenarios. Equally, potato seedbeds should be compaction-free, especially 25-30cm below the ridge apex, and be porous and free-draining.

HARVESTER PERFORMANCE

Ideally, there should be 5-6cm of loose soil below the seed tuber, then a layer of firmer but not compacted soil, to allow the harvester to work to a consistent depth without slicing tubers. At the same time, the ridge should be stable and not prone to wind or water erosion, water-induced slumping or gravitational settling.

Mark argues that since World War II, when the UK recognised the demand for self-sufficiency, growers have been farming too hard and destroying the productivity in soils. “As a result, we’ve been growing too many crops such as potatoes, carrots and onions on productive, irrigated, sandy soils in a 7-8-year rotation, which all require intense seedbed cultivation. The damage has been done and soils and production are barely sustainable.

“Now we’re starting to reverse the decline using regenerative techniques, and there’s plenty more we can do to build improvement into our soils and potato crop production methods.

“This is particularly important on our lightest, sandy soils. Here, it’s very easy to put the pedal to the metal and move earth deeply just because we can, but this de-stabilises soil and reduces its resilience to recover from damage.

“We must recognise that it takes time to build organic matter in these sandy soils even to low levels of just 2.5-3%, and in some rotations, if it wasn’t for the combined approach of organic matter amendment and use of cover crops, they’d hardly

be viable anymore,” he stresses.

Mark points out that cover crop roots aerate, allow water to drain over the winter and reduce nutrient leaching. However, the wrong choice before potatoes can be painful, he warns. “Growers will have to spend more time experimenting with and managing different cover crop regimes to ensure they work.

“Farmer attitudes have changed and if push came to shove, most would carry on with regenerative measures including a cover crop, even if commercial support and SFI payments weren’t available,” he believes.

Mark adds that that cover crops keep soils living for longer during the wet winter period and by maintaining the cover crop root channels for as long as possible, soils are better drained to greater depth. “The contribution of roots to the below-ground active carbon pool is often underestimated compared with the above-ground biomass.

“Best practice is to establish cover crops early by drilling in August or early September, and the aim is to maximise below ground biomass using



Questioning the standard

With only 3-4% of ridge volume occupied by tubers for typical yields, growers should ask why they’re shifting such large volumes of soil, suggests Mark Stalham.

a mix that provides shallow rooting, well-branched roots and plenty of thicker, vertically-orientated roots, over the relatively short growing period.

“Mixes cut risk, but utilising complex multi-species blends can be over the top and difficult to manage; you’re never quite certain what’s going to grow and what will fail. It’s also important to avoid species such as stubble turnips or chicory that leave residues that cause soil flow issues

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ROOTS Potatoes

- ▶ on destoners. Bamboo-cane like kale stalks can also create issues for the destoner or bed-tiller,” says Mark.

Cover crops should be terminated well ahead of primary cultivation; ideally in January or early February to allow the dying roots to detach from soil aggregates and create voids in the soil, he advises. “The aim is to make the most of this added porosity and improved drainage that cover crops deliver to allow us to cultivate soil to the required depth when it’s in a state that minimises the risk of damage.”

Then, the ideal moisture content to form beds is when the soil state is just below field capacity and in the friable range. The more air added into soil, the lower the plastic limit – the minimum moisture content at which the soil becomes likely to smear or compact. Cover crops can effectively allow working to around 2-3cm deeper, without creating damage, he highlights. “They help tremendously: it’s difficult to dry soil to 25cm depth through natural evaporation alone from the soil surface.”

According to Mark, cultivation following cover crops is key and



Compare and contrast

Destoned clay loam soil (L) versus the same soil bedtilled and destoned (R) with an overly-fine tilth. Photo: Mark Stalham

growers should start shallow – at 5-8 cm – then work deeper to create sufficient tilth to form ridges and allow flow through the destoner. Cover crops can also reduce bed-tilling ahead of destoning in heavier soils, he points out.

UTILISING SKILLS

Most contractors employ operators that are more than capable of adjusting cultivation, destoning and ridging kit

to accurately work within a 2-4cm range of depth, and these skills should be used accordingly, advises Mark.

“In a cereal crop system, you’d look at every operation and try to find ways of getting rid of at least one-pass or more with the cultivator. If you reduce the destoning depth by 3-4cm in the potato crop, that’s the equivalent of removing an operation from the establishment process of many other crops.

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Team skills

Most operators can accurately work within a 2-4cm range of depth, so these skills should be used accordingly.

“Remember that the amount of fuel you burn on the tractor often correlates with the amount of soil damage you do. Putting energy into moving soil is damaging and if you plough, rotovate and then bed-till very deeply using a 400hp tractor, you’ll significantly damage soil health in the long-term.

“The less we do and the coarser the seedbed, the more resistant the ridge to slumping when water comes along. While many think that creating smaller ridges will exacerbate greening, we’ve found the opposite because the ridges are more stable so collapse less.”

A RETHINK

Typical destoned ridges can contain 1200cm² of soil, but there’s no reason why 80-90t/ha crops can’t be grown with minimal greening in just 900-1000cm², suggests Mark. Often as much as 3000cm² of soil is moved, frequently more than twice, to create such a ridge – that’s three times the amount of soil in the ridge itself.

“Our target should be to only till half the soil we currently move. By operating to 30cm depth – that’s a big profile –

we almost produce so much soil we don’t know what to do with it,” he notes.

Based on research, Mark’s view is that soil shouldn’t be cultivated deeper than is necessary to produce destoned beds, and that producing a good ridge based on a 27-28cm depth of worked soil is achievable.

“We’ve found that destoning deeper than 35cm on sandy soils and deeper than 28cm on heavy soils will result in reduced yields. In addition, producing beds as shallow as 25cm won’t affect planting depth or time from planting to emergence; it also allows for soils to be cultivated closer to their optimum moisture content.”

Critically, most destoners lose 10-20% of the soil entering the front of the machine. Much of this falls out of the sides, either ahead of the intake share or out of the intake stars or shares. The key to avoiding this is matching bed profile and height to the required

destoning depth, explains Mark.

Shallower destoning requires shallower, flatter-topped beds. Once destoned beds have been formed, further soil loss occurs on the planter. Equally, deep destoning results in very loose soil which requires high pressures on planter hoods to stabilise

the soil in ridges.

This extra pressure often results in soil capping, delayed emergence and soil cracking leading to increased greening.

Shallower destoning – with wider-pitch webs and/or wider star

gaps and avoiding bed-tilling – leaves soil with larger aggregates which require less compression to stabilise ridges. This in turn leads to less erosion and slumping of ridges and fewer green tubers, says Mark.

“In our trials, shallower cultivation has no negative effect on yields, and in heavier soils, some very significant improvements in yield,”

The less we do and the coarser the seedbed, the more resistant the ridge to slumping when water comes along.

► he highlights. “In addition, seedbeds can be made appreciably coarser and shallower than current practice before any significantly increased risk of common scab or greening.”

Destoning shallower is a faster operation and there’s a wider weather window to operate in; in addition, labour and fuel costs are lower. It reduces the wear on machinery and results in lower repair and depreciation costs and decreases the chance of breakdown during the planting season, notes Mark. “We’ve also found that cultivation depth has little effect on nitrogen mineralisation, crop uptake, fertiliser requirement or input costs.

“By gradually increasing the depth of destoning on heavier soils, operators should be able to observe

the sudden change in soil being placed in the furrow, indicating where they’re close to the critical depth.”

When it comes to harvesting, providing the kit is adjusted to take into account the shallower ridge depth, bruising is generally unaffected, except on very stony soils where destoning deeper may have to be accepted.

SPOT TREATMENT

Highly stony areas of fields – for example, greater than 30% stones – are usually identifiable from stone content on the surface and can be ‘spot’ treated accordingly to reduce mechanical damage to both tubers and harvesters. There’s no reason not to destone at shallower depths in less

stony areas though, suggests Mark.

Large savings in labour costs can be made through 20-40% faster work rates and there are also significant savings in fuel of around 20-30% by cultivating and destoning beds shallower than is currently being practiced.

“In trials we’ve also seen that there’s a value of 3-5t/ha from the majority of the cropped area being planted in a more ideal weather window which can result from destoning when soil conditions are optimal.

“Where there are concerns and more soil may have to be moved, then growers should consider zonally tilling – equally if they can leave the soil alone, why not just loosen under the tuber?” concludes Mark. ●

Enhanced potato nutrition insights

New rapid petiole analysis reads crop nutrition as the plant grows allowing for rapid action

While most crop analysis tells you what’s already happened, petiole testing informs what’s happening now, in time to do something about it, highlights Mark Law of Cambridge Natural Solutions.

Having recently opened a new equipment and a biotech centre at March in Cambridgeshire, the firm offers the testing with just 48 hours, which is why it’s so valuable, he adds.

“Petiole analysis measures the mineral content of the leaf stalk – whereby the petiole connects each leaf to the stem – after free water has been removed. Because it targets nitrate rather than total nitrogen, it reveals what the plant is drawing on right now, giving growers a lever on canopy development and crop timing,” explains Mark.

In comparison with sap analysis which involves squeezing the entire liquid fraction from a leaf, petiole analysis is a more repeatable process, he suggests. “Sap analysis is somewhat skewed by however much water the plant happens to be holding that day. Removing free water first standardises the sample, so results can be compared reliably from one week to the next, giving consistent, reproducible figures against validated reference ranges.

“By contrast, conventional tissue

and total-nitrogen analysis measure stable compounds laid down over weeks of growth. That’s a sound picture of the crop’s overall reserves, but not of the day-to-day flows that show how it’s growing today. In medical terms, it’s the difference between a blood test and a biopsy – the blood reads current health, the tissue reads accumulated history,” says Mark.

This matters most where the margin for error is smallest – in progressive potato cultivation, regular petiole testing across the season lets growers top up routine blight sprays with the right foliar feed, nudging the crop back on track, believes Mark.

For Sootywells Farm, which grows more than 160ha of potatoes for premium markets, tuber number rather than total yield sets the price. Here, petiole testing is used to apply the minimum nitrogen for the crop’s requirements – an operation that deliberately holds back the lush top growth that comes with over-feeding, explains Mark.

“This favours tuber set instead – ‘toppy’, over-fed crops put their energy into haulm and set fewer. The petiole readings guide that balance, keeping the main crop just above the levels that’d otherwise slip into deficiency.”

The same discipline answers a



Leaf stalk mineral content

Petiole analysis measures the mineral content of the leaf stalk after free water has been removed, says Mark Law.

growing commercial and regulatory pressure, he highlights. “Applying only the nitrogen a crop can actually use and no more cuts input waste, reduces the nitrate left to leach into water, and sits squarely with the direction of travel on farm nutrient rules. In-season testing turns ‘use less nitrogen’ from a compliance headache into a precision decision that can lift quality at the same time.

“And because timing is everything, the response can be blended the same day by sister company, Law Fertilisers, which makes tailored multi-nutrient foliar feeds.”

Learning from European beet research



Research from around Europe was presented at the 80th IIRB sugar beet research congress held in Cambridge recently. CPM reports on some of the key lessons for UK growers.

By Mike Abram

Six sessions, more than 30 presentations and 110 posters at the 80th International Institute of Sugar Beet Research congress highlighted the breadth of ongoing work to 'advance sugar beet in a dynamic environment'.

Much of the research presented at the congress, held in Cambridge, is being conducted on mainland Europe, giving the opportunity for the UK industry to learn from colleagues across the channel without necessarily having to repeat the same experiments, or perhaps even mistakes.

One example could be from the Austrian experience of using cercospora-resistant varieties. Wibke Imgenberg, a project manager at Agrana Research & Innovation Center provided a classic case study of how quickly varietal resistance could be overcome by the disease pathogen.

She explained that Austrian sugar beet growers faced high pressure from cercospora. Mostly grown in the

northeastern part of the country, the western part of that region had higher rainfall leading to up to five applications of fungicide. In the drier east, up to four applications were sprayed, unless irrigation was used, when up to six sprays could be required.

"We're mainly limited to azoles," she said. "There are some products with other active ingredients combined with azoles, but we're not able to do a real active ingredient rotation, which is the reason why copper is routinely added."

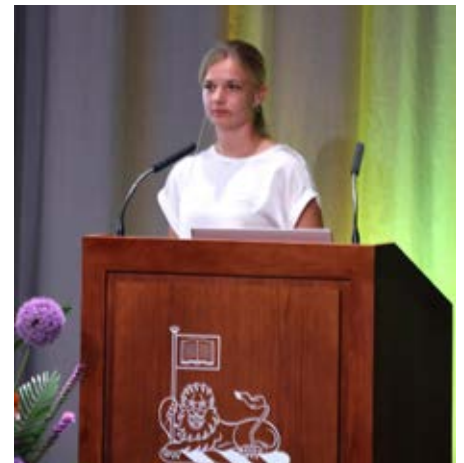
VARIETAL RESISTANCE

Prior to 2021, when the first resistant variety was introduced commercially, all varieties were susceptible to the disease, she highlights. "In trials, the resistant variety showed virtually no symptoms, even under high disease pressure," said Wibke.

Not surprisingly, the resistant varieties were quickly a commercial success, with 60% of growers choosing one in the high-pressure wetter west, and more than

"We have to start thinking about resistance management for variety traits as we do for fungicides or herbicides."

WIBKE IMGENBERG



Knowledge exchange

Wibke Imgenberg provided an Austrian case study of how quickly varietal resistance can be overcome by cercospora. ►

Do biostimulants deliver what they promise in sugar beet?

Trials across northwestern Europe have called into question whether two commercially available nitrogen-fixing bacterial biostimulants actually deliver

Research presented by Nordic Beet Research's Andrius Hansen Kemezys has focused on BlueN from Corteva, which is based on the endophytic bacteria *Methylobacterium symbioticum*; and Syngenta's Vixeran, based on free-living *Azotobacter salinestris*. Both products are claimed to replace 30-50kgN/ha by fixing atmospheric nitrogen, making it available to plants.

To test those claims, four research institutes in Denmark, Belgium, Germany and the Netherlands coordinated trials testing both products with different levels of nitrogen, explained Andrius. But while beet yields responded positively to increased nitrogen, there was no evidence that the biostimulants successfully replaced nitrogen at lower

application rates across the trials.

Across four trials in Belgium, Germany and the Netherlands, there were no significant differences in yields where BlueN and Vixeran were applied compared with the untreated, he reported.

Then in the Danish trial where Vixeran wasn't tested, there were some signs that at the lowest nitrogen level, BlueN improved plant vigour at the early stages of growth, and top (leaf) weight.

"This suggests that possibly the top growth is stimulated, but farmers aren't paid for this, of course, and we didn't see any statistically significant difference in sugar yield in this trial either. Unfortunately we can't confirm the added value of using these products," he said.



Nitrogen-fixing bacterial biostimulants

Across trials in Belgium, Germany and the Netherlands, there were no significant differences in yields where BlueN and Vixeran were applied compared with untreated, reported Andrius Hansen Kemezys.



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In the first two years, the resistant varieties demonstrated delayed cercospora symptom onset and 20-30% higher yields than standard varieties, but their effectiveness proved to be short-lived, explained Wibke.

By 2023, in a region close to the Danube River characterised by significant disease pressure because of high humidity and warm temperatures, the first severe cercospora symptoms were seen on resistant varieties. "That was the warning shot," she said.

Then in 2024, varietal resistance broke down, when an extremely warm spring led to disease detection two weeks earlier than usual, with resistant varieties showing the same symptoms as standard varieties, and the yield advantage shrinking to just 6%.

SHIFTING THREAT

The following year confirmed the breakdown wasn't just a temporary weather effect, with resistant varieties showing similar performance to standard ones. "We were surprised how fast cercospora adapts," she said. "The most important lesson is there's no single solution. We have to start thinking about resistance management for variety traits as we do for fungicides or herbicides.

"But we also wonder if we should somehow control cropping densities – could we slow down development by establishing a more moderate crop density of resistant varieties, especially in high pressure situations?" she asked.

Other key mitigations that in hindsight should have been used more were better use of tools, such as tillage and rotation to reduce disease inoculum and avoiding excessive reductions in fungicide use.

"In the beginning, farmers reduced fungicide use, but now we recommend they use the same programmes on both resistant and susceptible varieties."

In the session on current weed control research, Christine Kenter from the Institute of Sugar Beet Research (IfZ) addressed whether variety trials accurately assessed the true yield gap between conventional and Conviso Smart herbicide-tolerant varieties.

In Germany, its Recommended List-equivalent trials series suggested Conviso Smart varieties carried a relative white sugar yield penalty of 3-9% when compared with the mean of all tested standard varieties.

But these trials are all treated with a standard herbicide programme, whereas

one of the potential advantages of the Conviso Smart system is that there's very little phytotoxic effect on the tolerant beet plants when treated with Conviso One (foramsulfuron+ thienencarbazone-methyl).

That led to IfZ comparing classic herbicide programmes against two 0.5 l/ha applications of Conviso One on seven Conviso Smart varieties and two standard varieties without herbicide tolerance, across 28 trials in three seasons, said Christine.

The results showed that on average, there was a 4.3% improvement in white sugar yield when treated with Conviso One rather than classic herbicides, which, at least partly, balanced the current genetic yield penalty from growing tolerant varieties.



Weed control research

Christine Kenter from the Institute of Sugar Beet Research (IfZ) addressed whether variety trials accurately assessed the true yield gap between conventional and Conviso Smart herbicide-tolerant varieties.

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Is sugar beet detrimental to soil organic carbon?

German research suggests sugar beet might not be as damaging for soil organic carbon as generally assumed

Sugar beet is considered detrimental to soil organic carbon in many greenhouse gas calculators because of five main reasons, said the Institute of Sugar Beet Research (IfZ)'s Anna Jacobs.

First, with the roots removed there are few below ground residues, which are important for forming carbon that's stored within the soil. Conversely, the nitrogen-rich beet tops left in the field can speed up mineralisation of existing soil organic matter, causing the soil to burn through carbon stocks faster.

Other negative processes were harvesting, which caused significant soil aeration promoting increased activity by soil microorganisms breaking down organic material, and erosion both at harvest with carbon removed in soil tares and in early spring if no cover was being grown, she explained. "But there's no reliable database for this assumption," she noted.

Drawing on long-term trial data and information from the German National Agricultural Soil Inventory, the research suggests that sugar beet fields historically had lower carbon stocks, probably because of the effect of sugar beet cultivation and lack of cover crop cultivation during that period.

However, looking at more recent data, she shared that these sites seemed to be stabilising, with only minor additional carbon losses, with the increased use of cover crops mitigating losses through increased biomass inputs into the soil.

"We concluded that sugar beet isn't generally detrimental to soil organic carbon and we don't expect further losses on sugar beet sites," she said.

Those findings had implications for greenhouse gas calculations, added Anna. "Take care when using greenhouse gas calculators, particularly where they're using standard values."

Another issue hampering correct



Five factors

The Institute of Sugar Beet Research's Anna Jacobs highlighted various reasons why sugar beet is considered detrimental to soil organic carbon in many greenhouse gas calculators.

soil organic carbon modelling in the crop is the lack of reliable data on the belowground carbon inputs from sugar beet roots. "It's work we're doing at IfZ to sample fine roots to help calculate and model their effect," she concluded.

Conviso One was used alone in these trials, she noted, but that's not advised for resistance management reasons. "So we have to find out what the yield response is to using Conviso One in tank mixtures or in combination with additional active substances. This is work we started this year," she concluded.

The resistance management message was pertinent, given a survey by the IIRB's weed control subgroup suggesting that resistance to ALS herbicides was being demonstrated by at least 14 different weed species across Europe.

In the UK, ADAS weed scientist John Cussans warned that sulfonylurea herbicide resistance in broadleaf weeds is likely underreported, partly because of the lack of testing. ADAS tests roughly 100-300 grassweed samples a year for resistance, he said. "For broadleaf weeds it's often less than 10."

That's despite the most common application to a cereal crop being a sulfonylurea herbicide applied alone, creating significant selection pressure around the rotation for that type of chemistry. "In sugar beet, you bring in a crop that's tolerant to this type of chemistry, and suddenly the

problem is manifested," he said.

More testing is required to help growers understand the nature of their weed populations to help tailor management of such ALS-tolerant crops, he stressed.

MOLECULAR DIAGNOSTICS

Traditional pot tests have been available for some time, where test plants are grown from collected seed to a specific size and then sprayed to assess sensitivity levels. But collecting seed from broadleaf weeds, including poppy, chickweed and mayweeds is difficult, said John, while the test is slow, expensive and difficult to scale.

That makes using molecular diagnostic tests on DNA extracted from leaf tissue an ideal solution, he proposed. The test has a rapid turnaround and the advantage of being able to test for specific mutations that caused resistance to different ALS herbicides, said John.

Leaf tissue testing for resistance has then been trialled as part of a joint British Sugar / BBRO / ADAS project on 20 poppy populations collected from fields with sugar beet in the rotation, where resistance was suspected.

Eighteen of the 20 showed some level of resistance to one of the mutations, noted John. "It does reinforce the message around the prevalence of resistance being higher than previously found, and that we're not doing enough testing.

"It also reinforces the need to understand the resistance situation on-farm before the adoption of ALS-tolerant crops."

Südzucker's Dr Peter Risser suggested proactive resistance management is essential as reactive measures after resistance has developed are often less effective and more costly.

That might include incorporating mechanical weeding when growing Conviso Smart varieties, alongside other integrated weed control measures, such as combining Conviso One with other treatments, considering when and how to use ALS herbicides in other crops in the rotation, and cultural controls, such as tillage before drilling.

"It all leads to higher costs," he noted. "But I'm convinced that we'll come back to mechanical weeding where possible because this is a real break of resistance." ●



WITH JANINE ADAMSON

LASTWORD

Holding on for tomorrow

Perhaps because typically, it should be a non-CPM story; it's truly pushing the boundaries of what we report (I'm all for being a maverick!).

During my tenure at our beloved tome, I haven't shied away from the fact that I've experienced my own troubles when it comes to mental wellbeing. I've ridden the bucking broncho of anxiety, sat on the rollercoaster of depression... wrestled with neurodivergent traits, and battled with a host of repressed trauma. But oddly, I've never been in a more resilient state than I am today.

Life is absolutely brutal for me at the moment but I seem to be holding myself together, albeit with some baler twine and gaffer tape... and plenty of blind optimism. So how have I done it? How have I survived the grenade?

Well, I've returned to talking therapy. I know I can't do this alone and sometimes that means roping in the professionals. I'm not remotely ashamed, in fact, I'm pretty proud of the fact I've identified my state of mind and acted

before it's too late. I can offload to my therapist as someone who knows my past, who understands how my brain works, and who is an expert in listening.

Then, I'm allowing my friends to support me. Historically I've been a lone wolf and utterly dreadful at accepting help, but rather than keep them at arm's length, this time I've let them embrace me. Subsequently, I've been bowled over at the love and friendship I've received, and from the most unexpected directions too. If nothing else, I now know that I am loved.

Other tactics I've been using are being mindful and exercising gratitude. Yes I hear you groan, it's twee, but it works for me. Just noticing the small things that bring comfort – a hot shower, the sound of the dog pattering around on the kitchen floor, a homecooked meal. Small gestures that help to ground me and prevent my mind from spinning into the stratosphere.

Above all, I keep waking up with love in my heart. Again, feel free to roll your eyes, but I can't stress how important it

is for me to keep doing that. To believe in the goodness in the world, to have hope, to trust that this will improve.

Life is incredibly challenging, but time is a healer. Remember, no matter what your situation currently is, you are loved and valued. I really hope this magazine has the power to help, whether that's in its traditional knowledge transfer guise, or through its wider ethos and current editorial guidance. The latter, in its odd way, is an act of friendship, from me to you. ●

YOUR EDITOR

Janine Adamson began her journalistic career writing obituaries for a local newspaper but fast found her stride within agricultural communications. Now, more than 15 years later, she finds herself at the helm of CPM. A proud Staffordshire girl from the Moorlands, Janine takes pride in tackling subjects which although aren't exclusively farming, affect everyone.

“ Life is difficult for me at the moment, is it hard for you? As an industry, the past few years have been a relentless grind with little reprieve and it's affecting everyone, even this magazine. Then personally, well, the slurry has hit the fan and my face was the main target.

How do we all cope? It feels like so many of us are deeply struggling. I guess this was the primary driver for the story on page 46 – the importance of talking and being open to accepting help. I loathe to badge this simply a 'mental health' feature, it feels much bigger than that.

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