For farmers and their agronomists

CPM

CROP PRODUCTION MAGAZINE

June 2025

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Isoflex® active Herbicide

Isoflex® active brings two new active ingredients and one new mode of action to the autumn cereal herbicide market for the control of a wide range of grassweeds and broadleaved weeds in winter wheat & winter barley.

Isoflex® active will be available for use this autumn peri-emergence and pre-emergence in winter wheat and pre-emergence in winter barley. It comes as a ZC formulation containing two new active ingredients Bixlozone, (known as Isoflex® active) and Beflubutamid.

The mode of action of Isoflex® active (bixlozone) is the inhibition of carotenoid biosynthesis. It is the loss of this protective function of carotenoids which leads to the bleached symptoms on susceptible plants as well as a striking pink colour which can sometimes be seen on susceptible species.

Field Performance

Isoflex® active has been tested over many seasons in a range of field conditions across Great Britain and Europe. In trials, it has controlled some of the most challenging weed species in winter cereals. Isoflex® active has demonstrated an ability to be a significant contributor to an integrated weed management programme and a useful tool to help growers manage herbicide resistance.

Ryegrass Control

Ryegrass in recent years has further developed as a significant weed challenge in arable rotations, often exhibiting similar resistance mechanisms as seen in Blackgrass. Trialling Isoflex® active over many seasons has clearly demonstrated significant performance against this problem, bringing a new mode of action to aid in resistance management.

Isoflex® active co-form 1L/ha pre-emergence Italian ryegrass head count % control (2020-2024) = n27 trials. Untreated headcount average: 260 heads/m². Average control: 66%

RYEGRASS

66%

Average control

Average Unt Headcount = 260 heads/m²

Blackgrass Control

Isoflex® active has been thoroughly tested across a significant and diverse range of blackgrass pressure sites with some fields exhibiting over 1,000 untreated heads per m², including populations resistant to current widely used chemistry. Across all these sites the product averaged weed head count control of 53% from a single pre-emergence application of Isoflex® active. FMC does not advocate the solo use of Isoflex® active co-formulated herbicides for Blackgrass and Ryegrass control. When used in a programme with other approved actives including non flufenacet containing programmes, >95-97% control of blackgrass can be achieved.

BLACKGRASS

53%

Average control

Average Unt Headcount = 322 heads/m²

Isoflex® active 1L/ha co-form pre-emergence blackgrass head count % control (2020-2024) = n64 trials. Untreated headcount average: 322 heads/m². Average control 53%.

Untreated

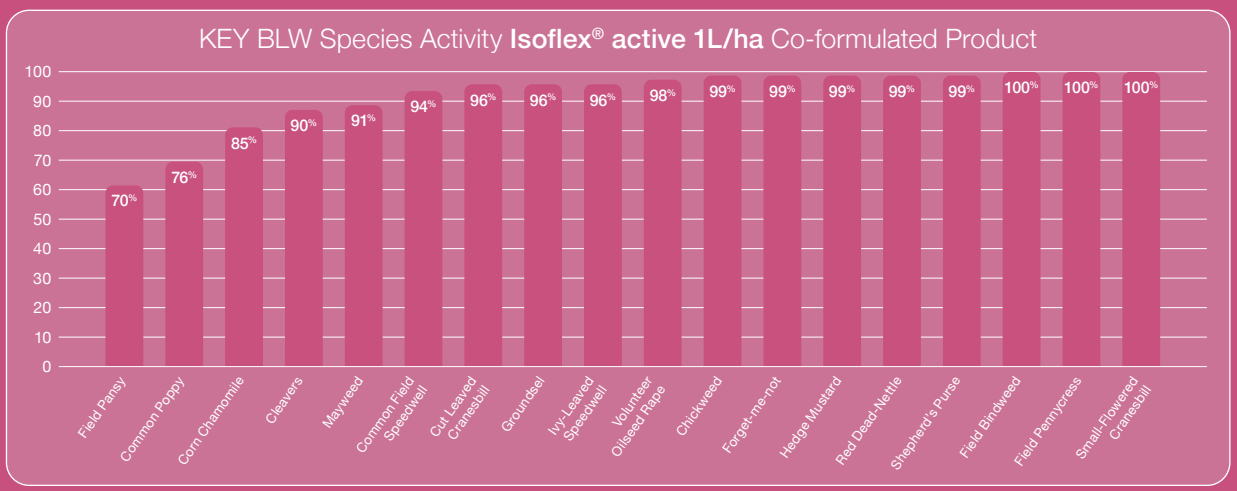
This photo shows the untreated plot. Key weeds found are ryegrass.

Treated

This photo shows a plot which has been treated pre-emergence with Isoflex® active 1L/ha co-form.

Broadleaved Weed Activity

Isoflex® active co-formulated herbicide brings significant value to broadleaved weed management, with a wide range of species covered, including some increasingly challenging species such as groundsel, ivy-leaved speedwell and red dead-nettle.



Our Growers Top Tips for Tackling Grassweeds

Mike Jones runs 4 farms across West Cheshire. The farms have a variety of soil types from sand to heavy clay and have been using minimum tillage operating systems for over 20 years. In the rotation, Mike has winter wheat, winter barley, winter oilseed rape, maize and grass.

To control ryegrass, Mike currently whole-crops the field and direct drills, which helps reduce the pressure of ryegrass. Herbicide usage has been the main method of control in his maize crops however recent testing of the ryegrass confirmed resistance to established chemistry forcing a rethink on his grassweed control strategy across the rotation. Mike has been keen to find a solution to tackle ryegrass in his cereal crops, so he has been involved with FMC herbicide trials for a number of years.

Ollie Stobo runs a 174-hectare arable farm near Woodstock in Oxfordshire, consisting of owned and tenanted land. The land primarily comprises Grade 2 stony brash, and crops are established through low disturbance, minimum tillage cultivations. The cropping plan follows a 4-year rotation consisting of 2 years of winter wheat, followed by spring barley and finally a break crop of either peas or spring oats. In terms of varieties, Ollie grows Extase, Palladium, and Skyfall, aiming to sell into milling markets, along with Laureat barley for malting.

Ollie's main approach involves cultural methods. He uses low disturbance, minimum tillage to establish crops, and then sheep graze the cover crops, which he finds also aids in weed management.

Ollie is always looking for more effective chemistry to address weed issues and conducts various trials on the farm.

‘Our commitment to UK arable farming is rock solid’

POINT OF VIEW

Whether gathered via staff at events, by reviews – such as those for the Recommended Lists and Nutrient Management Guide RB209 – or through the research ideas online ‘letterbox’, levy payers are a rich source of ideas.

This spring, we added the finishing touches to a three-year strategy for AHDB Cereals & Oilseeds to support the industry in these turbulent times. Based on levy-payer ideas, the strategy will invest in areas that support farmers to focus on production costs, yields, profit margins and strengthen farming sustainability.

Here are the four key pillars which the new strategy focuses on:

Pillar one is ‘strengthening together’ – we must work together to navigate continuous and often unpredictable change. As farming can feel isolated, our engagement team will promote and deliver evidence-based research and insights. Through on-farm activities and via Strategic Cereal Farms, Monitor Farms and Arable Business Groups, we aim to connect farmers and industry expertise to build confidence and resilience.

Pillar two is ‘actionable insights and expertise’ – we’ll develop a research and development roadmap based on the most pressing knowledge and resource gaps identified by levy payers. We’re already working on several exciting new research initiatives, including biopesticide efficacy, precision breeding and soil and nutrient management.

The third pillar is ‘expanding connections and partnerships’ – AHDB will collaborate and partner across the sector to deliver on initiatives that benefit and tackle industry challenges. By uniting the efforts of the many businesses and organisations, we’ll help farming to grow on a foundation of innovation and commercialisation.

Pillar four is ‘harvesting the industry insights’ – our team will continue to capture and provide timely data to help inform and deliver insights to levy payers. We’ll also provide robust evidence which guides the development of policy, regulations and farm assurance to support and protect your business. Our Environment Baselining Pilot investment will also provide insight for farmers going forward to support their decisions.

Our commitment to UK arable farming and domestic food production is rock solid. We’ll collaborate with industry to unlock value for levy payers and support growers in these uncertain times. Let’s continue together to innovate, adapt, and thrive in the face of uncertainty.

By Sarah Woolford
Sarah is sector director for AHDB Cereals & Oilseeds. Prior to this, she worked in corporate and leadership roles in commercial businesses and non-for-profit boards within Australia’s grain and pork sectors.

Share your views on our new look

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Earlier this year we re-launched *CPM* with a new identity and as such, want to know what you think.

From an updated logo to new page layouts, we scruitinised all aspects of *CPM* with reader experience front of mind.

To share your views, head to **smartsurvey.co.uk/s/CPMsurvey25** or **scan the QR code** with your mobile device. To say thank you, we’ll select a random participant to receive £100 of Amazon vouchers.

CPM CROP PRODUCTION MAGAZINE

We take a look at Hexton – the first variety to join BIPO's revised royalty scheme P.28

June 2025

COVER STORY

OPINION

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VARIETIES

Matt Fuller reveals his highest yielding milling wheat last year P.31

Why Karat has caught Kirsty Richards' attention P.49

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CPM
CROP PRODUCTION MAGAZINE

June 2025
Volume 27 No 5

By working with the best industry journalists, CPM remains at the top of its game.

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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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Solutions heading in-field soon

A fungicide active ingredient has recently been classified as having a unique mode of action in cereal crops, thus offering a potential boost for managing resistance concerns. *CPM* investigates this and some of the other pipeline prospects heading on-farm soon.

By Janine Adamson

Agriculture is a long-term game, and when a new active ingredient or plant protection product finally lands in the marketplace, it's often been years in the making. Subsequently, when such a launch is officially revealed to growers and agronomists, any element of surprise has undoubtedly been quashed in the meantime.

Although in some ways this could dull a product's celebratory fanfare, providing a glimpse of what's to come could also be perceived as reassuring – that the R&D pipeline has promising solutions on its way, albeit subject to regulatory approval.

With this in mind, Great Britain is set to become the first territory to access a novel fungicide active ingredient – flumetylsulforim – which offers a unique mode of action for cereal crops.

Marketed as Gilboa by Adama, flumetylsulforim was recently classified as Group 32 by the Fungicide Resistance Action Committee (FRAC). This novel mode of action targets nucleic acid metabolism, a biochemical pathway that hasn't previously been utilised in cereal fungicides, explains the firm's Jonny Oosthuizen.

SEPTORIA CONTROL

According to Jonny, Adama is focusing on positioning Gilboa initially in wheat, based around its activity against septoria. "It's widely recognised that septoria is a key, target disease which most fungicide programmes are built around. Although pressure from other foliar diseases may come and go, for example rust, the threat of septoria will remain," he says.

It's expected the active ingredient may also offer a viable solution for combatting ramularia in barley and sclerotinia in oilseed rape. But regardless, as a new mode of action, Gilboa represents a major step forward in fungicide innovation, providing growers with a ▶

Mode of action

The novel mode of action in Gilboa targets nucleic acid metabolism, a biochemical pathway that hasn't previously been utilised in cereal fungicides, explains Adama's Jonny Oosthuizen.

Resistance management
Gilboa should provide diversity in disease control, which is especially critical as all recent cereal fungicide launches have been of similar modes of action, points out Adama's Ben Miles.

new way to combat fungal pathogens, believes managing director Ben Miles.

"Its novel mode of action, along with its compatibility with existing fungicides, makes it a vital addition to disease management strategies. Gilboa should provide much-required diversity in disease control, which is especially critical as all recent cereal fungicide launches have been of similar modes of action," he points out.

However, beyond this, the development work continues. To build a robust knowledge base of the molecule and how it can best contribute to sustainable septoria management in wheat, Gilboa is being evaluated through an extensive series of UK trials, explains Jonny.

"We have clear evidence of the exciting levels of septoria control that Gilboa can offer and continue to work to best position the active in fungicide programmes. The UK is an agronomist-led market and we want to be a piece of that story. Therefore, we'll be driven by its performance in the field, and steered by the outcomes of those trials," he comments.

So far, the data suggests a promising outcome, adds Ben. "In wheat trials, Gilboa delivered superior septoria control compared with existing solutions. It also provided extended disease control, with a lasting effect of up to 35 days after final application.

"Trials have also revealed that more than 70% of the flag leaf area remained green for a longer period after the last treatment," he says.

Gilboa was submitted for registration in 2023 and is expected to receive approval in Great Britain in 2027, in the EU in 2029, and with further registrations planned for additional territories. "And while we're still a little way off bringing Gilboa to the GB market, new modes of action don't occur very often at all. We're confident this one will be worth waiting for," says Jonny.

OPEN DAYS

In the meantime, this season is all about capturing data while showcasing Gilboa to as many individuals as possible, he adds. "This is the first year of our 'Adama in action' field events initiative – where we manage five trial sites across England and Scotland.

"As well as demonstrating our wider fungicide portfolio in-field, this will also prove an opportunity to see Gilboa. Aimed at agronomists and other interested parties, anyone interested in attending should contact their regional agronomy manager as soon as possible."

Yellow rust resistance update

Further investigations confirm *Yr15* has failed

As reported in the May issue of *CPM*, concerns have been bubbling away regarding the potential breakdown of an important yellow rust resistance gene.

The alarm bell was first raised by AHDB at the beginning of April, having identified symptoms of yellow rust on almost all Recommended List varieties classed as resistant at the young plant stage during trial inspections in the north of England.

As time went on, this was then backed by reports of similar scenarios within commercial settings too, at varying levels across the country.

To investigate further, high quantities of samples have been sent to the Niab-led UK Cereal Pathogen Virulence Survey (UKCPVS) for testing, to provide a better understanding of the situation at hand. The service has since confirmed that *Yr15* has indeed failed.

Pathogen isolates from these samples not only infected a test variety known to carry the *YR15* gene, but then proceeded to sporulate profusely. Niab-funded work also confirmed the presence of the *Yr15* gene, using molecular markers, in several of the varieties impacted at the young-plant stage.

According to AHDB, the initial investigation prioritised testing of varieties with a strong level of adult plant stage resistance (disease rating 8 or 9), according to RL 2025/26. This has found that hard Group 4 varieties KWS Dawsum, LG Typhoon and Champion (DSV) all carry the *Yr15* gene.

Niab is now testing further varieties, with additional genetic screening being undertaken by the John Innes Centre and the Global Rust Reference Centre in Denmark.

"Adult plant resistance has clearly taken a knock, but the full impact will depend on a myriad of other resistance genes, which vary from variety to variety," explains AHDB's Paul Gosling.

"Some varieties appear to be fighting back, whereas others are recording unusually high disease levels. Although we haven't seen the unusual symptoms towards the South or West, it appears to be spreading fast.

"No doubt this will impact variety choice and disease management across the UK next season," he says.

In further response, AHDB says as RL disease ratings are usually calculated from data sets of between three and five years, with evidence of a major change to the pathogen population, the data set will be limited to a single year (Harvest 2025) for the disease rating calculations in the next RL edition (2026/27).

Long-term impact
AHDB's Paul Gosling believes recent developments in yellow rust resistance will impact variety choice and disease management across the UK next season.

Across 78 BASF field trials, Luximo® achieved an average black-grass control of 85%, compared to 72.6% from Liberator®+Proclus® (Label rates applied). According to Kynetec data, Luximo® was applied on 36% of the UK winter wheat area in autumn 2024. Use plant protection products safely. Always read the label and product information before use. For further product information including warning phrases and symbols refer to www.agricentre.basf.co.uk. Luximo® is the brand name for the active ingredient cinmethylin. Luximo® is a registered Trademark of BASF.

Broadening suite
Two new fungicide options are on the way from Sumitomo Chemical, highlights the firm's Ruth Stanley.

However, Gilboa isn't the only new fungicide product in the pipeline – UK growers should also have the option of two new solutions from R&D company, Sumitomo Chemical.

INDIFLIN AND PAVECTO

Indiflin (inpyrffluxam) is currently undergoing review by the Chemicals Regulation Division (CRD), explains the firm's Ruth Stanley. "This SDHI is already available overseas, for example, targeting rust in soya beans in Latin America. But for the UK market, it would be targeted at T1 or T2 applications in wheat for yellow and brown rust control."

Ruth adds that Indiflin is indicating high efficacy in UK trials, even when up against the severe brown rust infections that many growers experienced during the 2024 season.

Then also on the horizon, is new fungicide Pavecto (metyltetraprole). "This disruptive QoI fungicide is highly effective for the control of a broad range of diseases including septoria leaf blotch in wheat and net blotch and ramularia in barley. We're confident Pavecto will play an important role in resistance management," suggests Ruth.

She believes with the potential to lose some existing chemistry from the UK market during the next few years, new products, particularly those with alternative modes of action, will be of even greater importance. "This gives growers more choice and more tools to prevent disease development in the future." ●

Symptoms
According to AHDB, there's little correlation between fusarium-damaged grains and the presence of mycotoxins.

Mycotoxin rainfall risk tool

The AHDB tool has been activated for another season

Following a prolonged dry spell this spring, with some growers battling drought conditions as a result, the weather has finally broken. Furthermore, the Met Office long-range forecast predicts wet conditions will truly set in, at least until this issue of *CPM* hits letterboxes.

But as well as crops welcoming this much-required moisture, so too will pathogens, including ear diseases during flowering. An example being fusarium species, which can cause ear blights and result in the production of mycotoxins.

As growers will understand, there's a legal obligation to ensure grain is safe for human consumption and in line with legal limits, covering the fusarium mycotoxins in wheat grain: deoxynivalenol (DON) and zearalenone (ZON).

According to AHDB, there's little correlation between fusarium-damaged grains and the presence of mycotoxins, therefore the presence of ear blight symptoms shouldn't be used as an indicator of mycotoxin risk. It says this is what led to the development of its mycotoxin risk assessment tool, which has recently been re-released for another year.

Covering hundreds of monitoring sites across the UK, the online tool shows how much rain has fallen during the winter wheat flowering and pre-harvest periods. This information can then be used to help calculate the mycotoxin risk assessment scores required for combinable crops grain passports.

In winter wheat, the first rainfall risk period is during flowering (GS59 – ear completely emerged above flag leaf ligule) to GS69 (flowering complete). The second risk period is GS87 (hard dough, thumbnail impression held) to harvest.

Once the date range for each period is known, this is entered into AHDB's tool, which then calculates the amount of rainfall and corresponding risk score at each site. The scores are as follows, with the lower the number the better: score 9: >80mm; score 6: 40–80mm; score 3: 10–40mm; score 0: <10mm.

The mycotoxin risk assessment also details other factors that influence the total risk score, including the use of an appropriate dose of an appropriate, approved T3 ear fungicide.

And in a recent update, AHDB says usually, many winter wheat crops start flowering (GS59) from the beginning of June, however some have reached flowering earlier this year due to the relatively dry conditions.

To use the tool visit ahdb.org.uk/mycotoxin-rainfall-risk-tool-for-cereals

Get a head start on Autumn weed control

The relatively quiet weeks prior to harvest are a good opportunity to start planning weed control strategies for autumn. Bayer Technical Manager Rachel Banks takes us through how to get a head start for autumn before combining starts.

Map the problem

Weeds are currently visible in crops. Make a record of the weed spectrum and severity of any problems to support autumn planning. Different weeds have varying responses to cultural and chemical control, build the overall programme based on the target.

Delaying drilling is an effective tactic for controlling many problem grass weeds but does run the risk of poor establishment if it's wet like 2019 or 2023. Identify cleaner fields for drilling earlier and the highest weed pressure fields last. Last autumn, it worked out well for many because rain in September forced many farmers to delay. This was followed by good conditions in October and November for drilling and herbicides went on to moist seedbeds which helped efficacy.

Plan the herbicide programme based on the target. Proclus®(aclonifen) + Liberator®(flufenacet + diflufenican) provides a good base for controlling all main grass weed species. Then look to add other actives depending on the problem like tri-allate for black grass and wild oats, prosulfocarb for ryegrass or pendimethalin for brome and black grass.

Metribuzin co-forms like Alternator® Met and Octavian® Met are another option for bringing diversity into the programme at the pre-em. or peri-em. timing. They contain three modes of action providing good grass weed and broad leaved weed control.

Plan cultivation

There are many reasons to cultivate after harvest – weed control, residue management or removing compaction to name a few. Thinking about weeds, a good rule is that in dry conditions it is better to hold off cultivation and let UV light and predation get rid of weed seed, any cultivation is likely to cover seed and protect it from danger. In wetter conditions, a light surface cultivation promotes seed to soil contact and a chit of weeds which you can spray off with Roundup®(glyphosate).

Ploughing is the ultimate form of cultivation. It buries seed where there is a high weed burden and is very effective for brome control. Thankfully, there aren't that many heavily infested fields around this season but it's a useful tool to have.

Refresh your memory on glyphosate stewardship

Earlier this year, the first case of glyphosate resistance in Italian rye-grass was confirmed in the UK. Preventing the development of more cases is a priority for the whole industry. Don't take glyphosate for granted and focus on the correct timing, rate and application technique for every application to maximise control. In low disturbance systems, be particularly mindful of any weeds in the stubbles that have carried over from last season. They are likely to be bigger and need a higher rate.

Choosing the best glyphosate formulation contributes to better overall control. Trials show that Roundup® provides consistent control in all situations due to the formulation technology.

Bayer Technical Manager Rachel Banks

De-risking the riskiest crop on farm

Rather than focusing on factors which can't be controlled, what can growers do to proactively de-risk oilseed rape and up their chances of success at harvest? From establishment schemes to varietal choice, *CPM* explores the options.

By Rob Jones and Janine Adamson

Such is the threat of cabbage stem flea beetle and winter stem weevil and the difficulties with which they can be controlled, that for many UK growers, oilseed rape has become a high-risk crop. Arguably, this is best demonstrated through the gradual decline in cropping area which for Harvest 25, is estimated to be less than 250,000ha.

In recognition of the difficulties growers face when it comes to insect pest control, plant breeders and seed merchants have introduced risk sharing schemes as well as conducted work to identify the cultural measures which could support establishment.

As such, establishment schemes – whereby the grower is reimbursed either fully or partially for the cost of the seed – have proven so popular that around half of the 2025 OSR area is thought to be in a scheme of one form or another.

Similarly, research into the factors influencing establishment has led to the wider use of companion crops, improved nutrition and variety selection, to the benefit of the grower.

According to Agrii's national seed business manager, Rodger Shirreff, OSR has long been a challenge to establish well, but it was the burden of CSFB that raised the stakes. "OSR

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AGRONOMY INTELLIGENCE

Last chance saloon
Charles and Philip Roberts agreed to give OSR 'one last roll of the dice' this season, with the deciding factor being Agrii's establishment support scheme.

▶ has always suffered from pest attack and difficulties in establishment, but growers had the tools and experience to cope.

"The loss of neonicotinoid seed treatments, however, changed the economics of production to such an extent that the only way to maintain interest in the crop was for others to adopt a share of the risk. In fact, we estimate that roughly half the crop area is in a scheme of one form or another," he explains.

CRITERIA

Schemes vary in the extent of their support and the criteria under which they can be invoked, but the principle is much the same, adds Rodger. Importantly, crop failure isn't defined as 'by pest attack', but can be as a result of flooding or even excessive grassweed competition.

"Terms vary, but in general, a scheme has to be requested at the time of ordering; seed should be sown by 20 September and, in the event of a crop failure, a claim with proof of establishment and subsequent failure submitted by the end of October," he says.

Schemes are often variety dependant and not all varieties are underwritten to the same extent, warns Rodger. "Some varieties are backed with a credit note for the full invoice amount, others with a credit note for a set amount and others with the offer of free replacement seed for re-drilling.

"The Agrii premium scheme offers a full money back guarantee for seed bought at the full retail price regardless of the reason for failure. Choosing which scheme best meets your requirements comes down to attitude to risk and which variety best suits the situation," he suggests.

David Leaper, Agrii's seed technical manager, believes establishment schemes have helped to sustain interest in OSR while trials have sought to identify which varieties best meet a grower's situation by investigating different establishment regimes.

"Our experience is that where the crop establishes well, it'll go on to perform well, but variety choice is key to overcoming CSFB issues," he points out.

David highlights the success of grower guides in helping farmers to adapt to the threat of larvae damage. "In 2023, just 10% of the OSR area sown with Agrii seed was the subject of a claim, and in 2024, it was significantly less. A direct result of these schemes is

Indirect benefits

A direct benefit of establishment schemes is the de-risking of the crop, but an indirect result is that growers have become better at establishment itself, believes Agrii's David Leaper.

the de-risking of the crop, but an indirect result is that growers have become better at establishment."

RISK AVOIDANCE

A consequence of this risk-averse attitude is a reluctance to experiment with new varieties, he believes, with growers instead choosing to remain with those which have performed well in the past.

"Reliability is a big factor for growers. DK Exsteel, for example, is now in its seventh year and was Agrii's second best-selling variety in 2024. It's been technically surpassed by varieties with TuYV resistance but is still one of the highest yielding varieties on farm," he says.

This season, Agrii is introducing Recommended List candidate DK Exedge as a potential successor to DK Exsteel. "DK Exedge has looked exciting in our trials during the past two years – it has the vigorous spring regrowth that we look for to grow away from larval damage," adds David.

Despite this year's OSR area looking full of potential for many, it's last chance saloon for the crop at Riggall's Farm near Boston, according to cousins Charles and Philip Roberts.

While they admit the farm's 35ha of DK Exteel looks superb and with plenty of potential, their caution follows two years of heavy crop losses due to CSFB damage. "We'd been growing OSR pretty successfully for a number of years with the Dekalb Ex hybrid varieties," says Charles.

"We liked them because they were pod-shatter resistant, relatively compact and consistent. But as soon as neonicotinoid seed treatments were banned we started to struggle with CSFB. Although we had a year or two where it wasn't too bad, the past couple of years have been a complete disaster," he adds.

Historically, OSR has been an important break ▶

Deciding factors

KWS' Rory Hannam believes there are five essential characteristics to look for when selecting an OSR variety.

crop on the farm, highlights Philip. "This is a heavy land farm – wheat is our number one crop and OSR has been our number one break crop, but it now has a question mark over it.

"But we're very limited for break crops. During the past 25 years OSR has become very important for us and if we lose it, it'll leave a massive hole."

Late last summer, the cousins agreed to give it 'one last roll of the dice', drilling what might potentially be their last crop between 6 and 10 September. The deciding factor was Agrii's establishment support scheme, under which DK Exsteel is among the varieties supported, along with backing from Bayer.

"There's a fine margin between winning and losing. The establishment scheme made the difference this season because if the OSR had failed, we knew we could recoup the cost of the seed," concludes Charles.

KWS UK's product manager for oilseed rape, oats, peas and rye, Rory Hannam, understands that OSR remains one of the most scrutinised crops on the farm. With this in mind, he says building resilience into the crop starts with matching a variety to its proposed location, where growers focus on taking advantage of the

Pod shatter resistance

With more frequent and unpredictable weather events in July and August, pod shatter varietal resistance has become a 'must have' for many.

Building resilience

DSV's Sarah Hawthorne says resilience of varieties has been a key company priority for many years.

Aiming high

Despite a decline in OSR hectarage, plant breeders haven't stalled when it comes to delivering innovation

Perhaps ironically, as the UK OSR area reaches its lowest point for some years, varieties are at their absolute best, believes Agrii arable seed specialist, David Leaper.

"The breeders have put a phenomenal amount of work into stacking traits, bringing different disease resistances together and improving physical properties such as standing.

"Numerous trials have shown early developing varieties that are able to cope with difficult establishment conditions and grow away quickly in the autumn cope best with cabbage stem flea beetle. Good vigour in the spring also helps to avoid problems at the larval stage," he says.

DSV's Sarah Hawthorne agrees, saying resilience of varieties has been a key company priority for many years. "That all-important vigour, plant architecture and ability to grow through pest and disease threats underpin much of our current OSR range with hybrid breeding at the heart of this.

"We continue to invest in genetics to further build resilience. DSV's Phoma Blocker trait, for example, features a resistance mechanism completely new to Europe and is already featured in our varieties Cognac and Dompteur.

"The technology adds a much-required additional layer of security by the inclusion of LepR1 or RlmS to the widely used Rlm7 resistance," she says.

In recent years, the breeder's clubroot protection has also played an important role in keeping spread of the disease in check, adds Sarah. "We've been particularly successful in this area with varieties such as DSV Crocodile CR, and the new DSV variety Cromputer CR offers even greater protection.

"New OSR genetics have also been developed by DSV to improve harvest performance by building on traditional pod shatter characteristics. Our latest RL addition DSV Dolphin is the first of a new generation of hybrid varieties specifically developed to combine a key set of genetic traits to protect them against adverse weather conditions later in the season.

"All of these developments add to the future viability of OSR and allow growers to have greater faith in its ability to deliver high margins."

latest breeding developments to allow crops to reach their full potential.

"In many ways, the success of an OSR crop is decided before the drill even hits the field. Variety choice has always mattered but it's becoming pivotal to managing OSR risks and delivering performance," he continues.

Rory believes there are five essential characteristics to look for when selecting a variety and deciding on the right management approach – all traits which align closely with the realities of growing OSR in today's conditions.

First and foremost, he cites autumn vigour as critical, particularly when drilling later in the season to avoid CSFB migration, or on areas known to have the highest incidence of the problem. "A fast-developing variety that can push through the cotyledon stage and put down roots quickly and build biomass, gives the crop the best possible head start," he explains.

"In fields where drilling is in late August or into September, we require a variety that gets out of the ground quickly to help survive potentially tough conditions. That early vigour isn't just about beating CSFB. It's also about reducing herbicide reliance, competing with weeds and compensating for early pest damage."

At the other end of the season, harvest security becomes the focus – with more frequent and unpredictable weather events in July and August, pod shatter varietal resistance has evolved from a 'nice to have' into a 'must have', he believes.

"Pod shatter resistance is an absolute necessity. It only takes one thunderstorm or a few days' delay with the combine to knock serious yield off the crop if pods are brittle and over-mature. Modern hybrid varieties with robust pod integrity also allow greater flexibility around harvest preparation and timing – a key advantage for busy arable businesses with large areas to cut."

> ***"Wheat is our number one crop and OSR has been our number one break crop, but it now has a question mark over it."***

A third trait climbing the priority list is resistance to turnip yellows virus (TuYV), a potentially devastating virus spread by peach-potato aphids. "As control options dwindle and resistance to insecticides becomes more widespread, the ability to safeguard OSR crops against TuYV via genetics is increasingly attractive.

Piquing interest

Oxfordshire grower David Passmore says Hinsta (KWS) is showing promise as a standout hybrid variety.

"We're seeing aphid resistance to pyrethroids and growers choosing to not apply these to crops to enhance the pest's natural predators. At the same time, the window for insecticide applications is getting tighter, so it's not advisable to assume we can spray our way out of trouble," he stresses.

"Choosing a variety with TuYV-resistance is a key option in any integrated pest management plan to help mitigate the virus."

MIGRATING DISEASE

Light Leaf Spot (LLS) has traditionally been associated with wetter, cooler conditions in the North but that's no longer the case, highlights Rory. "During the past five years, LLS has become more widespread and we're picking it up regularly in OSR across the Midlands and Southern Counties.

"It's a disease which can have a significant impact on canopy development and ultimately yields. Building a strong resistance score to LLS into your variety choice criteria is now essential across the board."

Finally, structural strength is a trait that often flies under the radar until OSR crops begin to lodge, he points out. "As plant biomass increases through the spring and into flowering, stems have to be able to carry that weight without collapsing.

"There's been a lot of progress in seed breeding to improve stem stiffness and lodging resistance in OSR, but it should still be a key consideration for variety selection especially in fertile soils or with high nitrogen regimes. A well-structured plant is easier to manage and able to make the most of its potential right through to harvest," comments Rory.

For Oxfordshire grower David Passmore, the value of these five traits became clear in his first season growing a commercial hybrid OSR crop."Hinsta (KWS) is showing real promise as a standout hybrid variety for us. All of the traits we look for play to Hinsta's strengths, and it really is shaping up to fit our system well," he says.

Drilled in early September into wheat stubble using a subsoiler, David applied digestate at establishment and hoped for a clean start – something he says the crop delivered. "It established cleanly, showed no sign of disease, and the canopy is exactly how I wanted it – not too thick, but full of potential.

"Even after a challenging start to the season, the crop has come through really well. It's the kind of variety that doesn't race away too quickly, which is exactly what I'm looking for," he adds.

According to David, this balance of steady growth and strong early vigour proved ideal for the farm's rotational timings. "This is our first time growing hybrid OSR as a commercial crop rather than for seed, and based on Hinsta's performance, we'll definitely keep OSR as part of our wider rotation. It's proven it can handle pressure and still deliver." ●

Taking full control of crop trials

A new state-of-the-art glasshouse facility has been opened at Agrii's Throws Farm Technology Centre in Essex to help the company fast-track its trials activities and therefore speed up the adoption of alternative crop inputs. *CPM* joined the team to find out more.

By Janine Adamson

On the face of it, a 480m² technology-driven glasshouse might not appear so relevant to the world of arable crop production. Afterall, such structures are mostly associated with either the fresh produce industry or ornamentals sector.

However, this is a glasshouse with a greater ambition – to enable the screening of the latest alternative crop inputs across a breadth of scenarios, from broadacre combinables through to amenity applications.

In doing so, it's hoped products can be trialled not only faster and more robustly, but with greater focus too, says Agrii's head of integrated crop technologies, Dr Ruth Mann. And the ultimate aim? To enhance the knowledge of the company's agronomists which in turn, will support growers to future-proof their businesses.

"Agrii is already undertaking hundreds of field trials across the country, annually. But as the R&D pipeline steers more towards biosolutions – whether that's biostimulants or biocontrol agents – it's becoming increasingly difficult to bring those products together to formulate an integrated pest control strategy," explains Ruth.

INTEGRATED APPROACH

"We have to understand how to stack these new innovations together for the best result, as well as how we might integrate them within traditional regimes, both plant protection and nutrition."

The problem with relying on field-based trials, she adds, is that nothing is guaranteed, for example, the presence of disease to test a specific product claim. Coupled with the fact trials are becoming increasingly expensive to undertake, means in many ways, they're high risk.

By switching to a glasshouse-based regime for initial screening, this means Agrii can hand-pick which products are then taken to the field, streamlining the entire process. "With the capacity to conduct trials year-round in a very focused manner, we can evaluate products in isolation or bring them together to understand the cumulative effects of those stacks and programmes of the future.

"Being a contained environment, we have full control of what's happening including the ability to ensure disease infection at specified timed intervals. You simply can't achieve that level of control in the field," adds Ruth.

This isn't the death of field trials though, she stresses. "It's more of a fast-fail process which facilitates speed and focus; improving the efficiency

External variables

The problem with relying on field-based trials is that nothing is guaranteed, for example, the presence of disease to test a specific product claim, says Agrii's Dr Ruth Mann.

Quick off the blocks

Agrii's Jodie Littleford has already used the glasshouse facility to conduct a trial looking at adjuvant efficacy and herbicide stress.

Grand opening

The 480m² technology-driven glasshouse was opened at Agrii's Throws Farm Technology Centre last month.

of what we do take to the field.

"Equally, the glasshouse enables us to undertake 'look-see' type activities without having to wait for the next season of field or on-farm trials. With much uncertainty at a regulatory level and changes occurring regularly in Europe, we can use the facility to scenario plan and identify potential routes forward."

In terms of the structure itself, the glasshouse has five bays and is powered by LED lighting and an air source heat pump. An intuitive Tomtec control system automates aspects such as light levels, temperature and humidity, whereas PAR (photosynthetic active radiation) sensors ensure plant photosynthesis is optimised for ideal growing conditions.

Using the latest, sustainability-focused technology is important to reduce energy waste and therefore minimise Agrii's carbon footprint, notes Ruth.

Although the facility at Throws Farm was officially opened at the end of May following £1M of investment during its construction, the team has been using it for the past three months in its bedding in period. Technical manager for combinable crop trials, Jodie Littleford, has used this opportunity to get work underway including a project looking at adjuvant efficacy and herbicide stress.

"The trial involved mimicking field conditions for a crop of spring barley, applying a strong herbicide tank mix to replicate what growers may be using in the face of new available chemistry. This was applied with and without Agrii's preferred cereal adjuvant product to highlight the role it may be playing in mitigating leaching," explains Jodie.

"The difference between the trays was like chalk from cheese – without the adjuvant you could clearly see herbicide damage, therefore confirming the adjuvant's importance."

This trial also enabled the team to use the glasshouse's spray booth to evaluate coverage pattern on the leaf. The booth can also be used to test application technology more generally, including nozzle choice, water volumes and application speeds.

KNOWLEDGE TRANSFER

Once trials have been completed in the glasshouse and results evaluated, the subsequent information is then disseminated to Agrii's agronomists. "We perceive this as adding value to our agronomy service," comments Ruth.

"In a world where a significant proportion of pipeline R&D is biological-based, we're no longer going to have the breadth of traditional crop protection solutions that we once had. It's critical we find ways to enhance what an agronomist can offer.

"So, we want to support growers in knowing exactly what biological products are doing within plants, and therefore understand when within a crop's life cycle they should be used."

Ruth highlights that the team isn't finished yet either. "We're currently installing a hyperspectral imaging scanner in the glasshouse. This will enable us to see inside a plant, beyond what's possible with the human eye.

"This transformative technique can detect abiotic and biotic stresses, well before visible symptoms are present," she explains.

But with a specialist facility comes the demand for specialist expertise. Acknowledging this wasn't something Agrii could address using its existing personnel, the company took the decision to invest in new team members including glasshouse manager, Darlington Tenkorang.

Controlled environment

By switching to a glasshouse-based regime for initial screening, Agrii can hand-pick which products are then taken to the field, streamlining the entire process.

In addition to this, a new trials manager will then oversee specific projects undertaken by the wider Agrii trials team.

However, an added benefit for arable customers, is that the glasshouse pulls together expertise and 'brains' from the entire Origin business – Agrii's parent company. This includes colleagues from its horticulture and amenity divisions, sectors where biosolutions have become long-established and integral management tools.

Jodie believes that in taking this fully-integrated professional approach, coupled with state-of-the-art equipment, Agrii will be perceived as an attractive partner for product innovators and SMEs. "We now have the tools required to screen and finesse new innovations, helping to increase their potential adoption rate on-farm," she concludes.

Smith's SOAPBOX

WITH GUY SMITH

Seedy speed dating

Visiting Cereals 2025 in Lincolnshire found me in a nostalgic mood – it's a sobering thought that in 2029 the event will be 50 years old. That's presuming its appearance on Clarkson's Diddly Squat Farm next year doesn't kill it off.

It's worth noting that the first event all those years ago was in the Cotswolds, with 2026 being the first time it'll return to those brashy soils. Hopefully it's not a case of first and last...

While I didn't visit the initial Cereals in 1979, I've been visiting every year since the mid-1980s – that's 40 years of attendance. In those days the Cereals Event and Sprays & Sprayers were two different shows.

If you were really keen and didn't mind a super early start, there was also the Velcourt open day to attend. The basic concept behind this day was to apply increasing loads of chemicals to plots of the same varieties of wheat, barley, OSR, peas and beans to see the yield response. If I remember rightly, the overall result was usually the more you put on, the greater the yield with a better the margin to boot.

Today such chemophile Velcourt-hosted demonstrations are long gone and we have Groundswell instead. I suspect if you suggested at Groundswell that a cocktail of five sequential fungicide applications plus three broad-spectrum insecticides plus 300kgN of fertiliser was the best approach to growing wheat, you'd probably find yourself in a pit being stoned by the Pharisees of the regen church.

Similarly, just recently, Defra's head honcho Steve Reed was in front of the Environment, Food and Rural Affairs Committee telling them everything would be alright for UK arable farmers because in the future we'd be applying less inputs while maintaining the same yields.

I'm not quite sure which set of replicated field trials Mr Reed was referring to here, but I did find it somewhat patronising to be told the answer to improved profitably was that easy-peasy. As someone who, back in the day, was sceptical about the 'produce even more with even more' approach of Velcourt, I'm even more sceptical that Mr Reed does actually know how to produce more with less.

Having said that, given the lack of rain, septoria and rust on the farm this year, half our wheats only had one fungicide application. The bad news for Mr Read is that because of the drought they won't be producing a greater yield or a better margin.

But back to the Cereals Event, which for me is about varieties. I've always compared it to speed dating where you have a few minutes staring into the eyes (or ears) of various contenders that catch your attention, with the expectation you might enjoy them back at the farm next autumn.

I should add I've never been speed dating and nor would I know if going to the Cereals Event is anything like using Tinder, but what I do know is while I've only had the one wife, I've had dozens of different wheat varieties most of which I first met at Cereals.

From Norman and Avalon in the 1980s to SY Cheer and Goldfinch today, it's been a rich pageant of hope over the expectation that I might finally have found the perfect variety to match my fumbling ham-fisted farming.

There have been some triumphs and disasters along the way, but in the words of Kipling, I've tried to treat both imposters just the same. Indeed back in the day there was a spring barley called 'Triumph' whereas I've never come across a cereal variety called 'Disaster'. Having said that, I've had a few varieties that either didn't pollinate or were plastered with rust for whom 'Disaster' would have been a very apt name. Actually their names were Moulin and Slejpner.

So what did I learn at Cereals 2025? As always there were some new varieties which turned my head, but I resolved it's best to stay loyal to what I have in the seedbed back home. After all, I doubt I'll be learning Diddly Squat at Cereals 2026. ●

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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Top of the crops

As arable growers navigate another season of dry springs, input scrutiny, and tighter margins, *CPM's* latest wheat variety survey reveals a growing appetite for dual-purpose reliability, flexible agronomy and straw that pays its way.

By Charlotte Cunningham

Despite industry changes, wheat remains king of the UK arable rotation. According to a recent *CPM*/KWS survey, 100% of respondents grow winter wheat, with 32% planting more than 100ha of first wheats alone. Yet beneath that broad commitment lies a sector shifting its priorities, trialling new systems, and weighing variety choices with greater nuance.

Delving deeper into the numbers, barley remains the second most common cereal with 76% of respondents growing it, while oats are grown by 48% – a figure that may surprise some, suggesting a resurgence of interest in this versatile crop.

Rye and maize are less frequently grown, at 14% and 24% respectively. "Wheat is definitely still king of the rotation," says KWS' Olivia Bacon. "Many farmers are now even considering continuous wheat, especially as options for break crops diminish."

Second wheats are on a more modest scale, with more than half of those surveyed planting between 20ha and 40ha. This disparity likely reflects the agronomic challenges and slightly diminished returns associated with second wheat crops, such as higher disease risks and the potential for lower yields, notes Olivia. "Unless you're a milling grower aiming for premiums, second wheats tend to not be as profitable. So that hectarage is often more conservative."

PRIORITY CROP

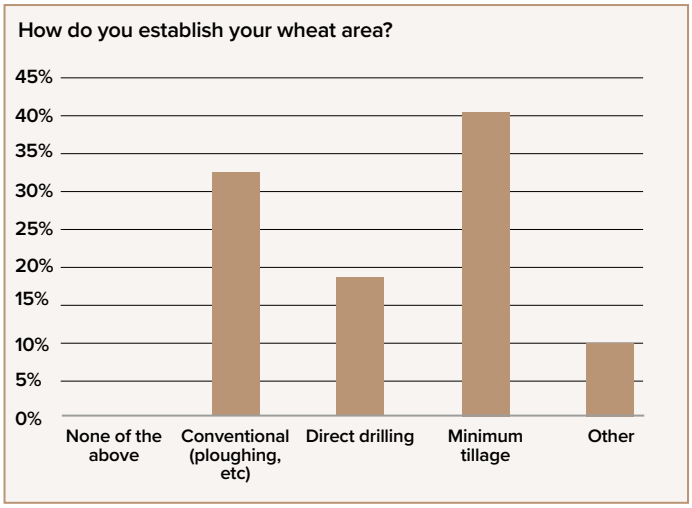
In Norfolk, wheat is a mainstay in William Runciman's rotation. The 200ha mixed farm near Fakenham comprises a 200-head suckler herd and 400 beef finishers, supported by the arable enterprise with winter wheat, sugar beet, forage maize and vining peas forming the rotation. "Wheat is still very much a priority crop for us, and everything we do is based around generating as much straw as possible for the livestock."

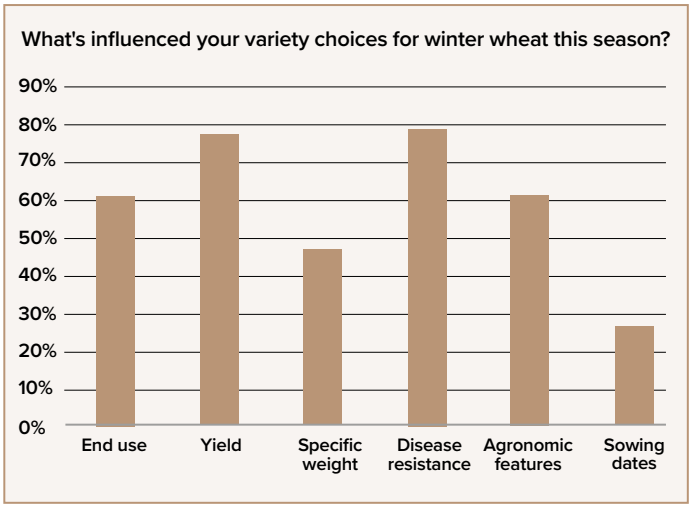
While growers are united that wheat remains quite literally top of the crops, there's a split in opinions when it comes to optimal establishment, with the survey signalling a transition in practices. Almost half (40%) of growers said they now use minimum tillage as their primary establishment method, however, a significant 32% continue to rely on conventional tillage, whereas just 18% said they opt for direct drilling.

"Min-till is a popular middle ground," says Olivia. "But it's not about throwing the plough away. A lot of farmers still use it periodically – maybe every four or five years – depending on field conditions."

The trend suggests a growing emphasis on soil health and system flexibility, she

A shift in importance
Disease resistance slightly outranking yield in a list of grower priorities is really telling of the high disease pressure challenges faced over recent years, says KWS' Olivia Bacon.





adds. "It's all about doing what works for your land and adapting to the season."

Although having a plan in place is recommended, so is an element of flexibility – particularly with increasingly unpredictable seasons becoming the norm. As such, many growers indicated they employ a flexible system, combining min-till or no-till methods with occasional ploughing to reset fields where necessary – particularly after problematic crops or in the face of persistent weed issues.

This hybrid approach reflects a pragmatic balance between sustainability goals and agronomic realities and is one William is an advocate of, too. The Runcimans take a field-by-field approach to establishment, using whatever system suits the conditions and soil at the time, he explains.

"We have the kit and the confidence to be flexible. Typically, we'll bale and remove straw straight after harvest then do a light cultivation to green up volunteers. Once we have a chit, we'll go in with glyphosate, then low-disturbance subsoiling to lift the profile and get air in."

Drilling uses a Horsch Pronto, which allows for quick establishment and good seed-to-soil contact. "On heavier areas or in wetter seasons, we'll plough and drill one after the other," he adds. "No frills; just what's needed."

For first wheats – which usually follow forage maize – the same principle applies. "We're straight in behind the forager with the subsoiler and the drill. Again, if it's too wet, we'll plough it up. Flexibility is the name of the game.

"We don't drill too early in a bid to reduce disease and virus pressure. For first wheats, we typically aim for early October, depending on when the maize is chopped."

When it comes to selecting wheat varieties, in a perhaps interesting shift, disease resistance just pips yield to the post at the top of the list of priorities, with 78% of growers rating it as a key factor.

Olivia says while yield remains a primary driver – cited by 77% of respondents – this focus on disease is understandable given the heightened disease pressures seen in recent seasons, particularly from yellow rust and septoria.

"Disease resistance slightly outranking yield is really telling. Last year's high disease pressure is still fresh in everyone's memory. Plus, this year we've observed some unexpected issues with yellow rust, which is still evolving now, but we will see some varieties resistance scores changing next year.

"These developments are prompting growers to look more closely at genetic resilience and not just the headline yield figures."

STRATEGIC CHOICES

Utilising inherent disease resistance within varieties is an area AHDB has been exploring – namely, how strategic varietal choice can be used to reduce fungicide intensity. So just how far can genetics take farmers when it comes to reducing inputs?

"The RL has made it very easy to identify varieties with strong genetics," explains Ellie Dearlove, AHDB knowledge transfer manager, cereals and oilseeds. "Varieties with higher levels of disease resistance allow greater flexibility in fungicide programmes, including the omission of sprays and the use of reduced doses, while still maintaining acceptable yield and quality."

Winter wheat varieties with septoria ratings of 7 or higher are proving particularly useful, she adds. Not only do they provide insurance against early-season infection, but they also allow for reduced fungicide programmes without a significant drop in yield or quality.

Delving into the detail of just how low farmers can go, as a baseline, Ellie says if varietal resistance is high, weather isn't conducive to disease and fungicide applications are well-timed, lower-input approaches could help increase crop profitability. This could include skipping a T0 in resistant varieties unless disease pressure is high, as well as tweaking a T3 spray depending on fusarium and brown rust risks and the market requirements.

T1 and T2 applications remain crucial, especially for septoria and rust management, but there's the opportunity in some situations depending on risk factors including resistance ratings and the weather, she adds.

Variety selection is also often dictated by intended end market, and while dual purpose wheats – those which are capable of serving both milling and feed markets – are widely available, the survey indicates that they've not yet achieved widespread adoption.

> ***"What we're seeing is farmers are being more analytical and flexible."***

Just 25% of respondents said they regularly grow dual-purpose types, while a further 37% make use of them depending on seasonal and market conditions. "I'm quite surprised by that," says Olivia. "A variety like KWS Arnie, which performs like a high-yielding feed wheat but also meets milling spec, offers a real safety net. If you don't hit milling quality, you still have a profitable feed crop."

KWS Arnie is a Group 2 variety that combines milling quality with the high ▶

A no-brainer

For Norfolk farmer William Runciman, growing KWS Arnie has been a no-brainer due to its high straw output – a vital requirement for the farm's beef enterprise.

yields typically associated with feed wheats. Its versatility makes it a strong candidate for those who wish to retain marketing flexibility while pushing for high performance in the field.

With straw a priority for William, he says growing Arnie has been a no-brainer for them. "We were approached by KWS and asked if we'd be interested in trying Arnie, and we said yes straight away.

"The standing power and straw output were immediately appealing, but as a farm that's always grown seed under contract, it aligned well with our existing setup."

Last year marked William's first full season with Arnie and he says he was pleased with its debut. "It really impressed us. It stood well, had great straw integrity, and delivered a clean, easy-to-combine sample. Compared with other varieties on the farm, it was incredibly tidy through the machine."

Fungicide inputs have also been kept low. "Arnie has proved itself to be a very cheap crop to grow. Last year and this, we've only used a simple programme – straight tebuconazole at T1, followed by folpet, Revystar (fluxapyroxad) and azoxystrobin at T2 and prothioconazole and tebuconazole at T3. This year we've cut out the Revystar and the crop is still very clean as a second wheat.

"I think the key is understanding your own system and soil. Arnie might not be the best fit for every hectare, but for us, in the right places, it's delivering what we require – good standing power, solid yield, and dependable straw."

This year, Arnie is covering 26ha, matched by an equal area of KWS Maximise. "Maximise is another interesting variety which we think may be more suited to our lighter land. But where Arnie is in stronger ground, it's holding on well."

NITROGEN APPROACHES

Nitrogen strategy is another area where practices vary significantly. Around 47% of growers reported sticking strictly to feed protocols, while 32% said they manage nitrogen applications to meet milling specifications.

"The nitrogen strategy is pretty straight forward for us, using a little and often approach, normally four splits as we've got the time to do it. We begin and end with a feed mentality because it's the most realistic option for us," says William. "We're not on land that will consistently achieve milling spec – it's not blow-away sand, but it's not heavy clay either, so we usually grow for feed, although this year we did trial an additional 50kg of nitrogen late in the season to see if milling quality could be within reach."

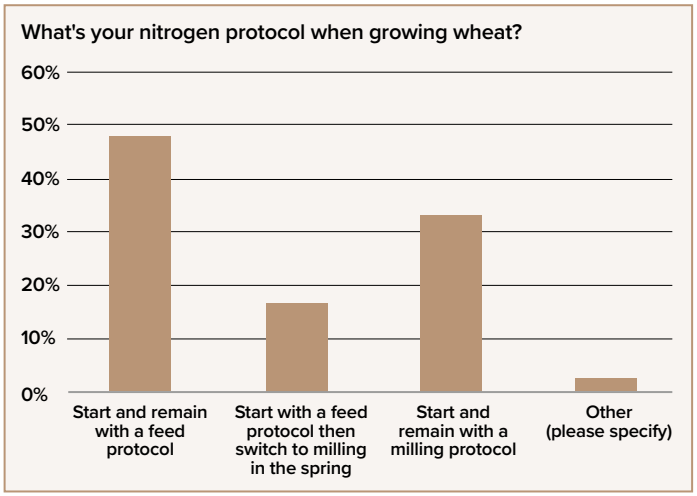
The remainder of growers surveyed said they take a flexible approach, adjusting their strategy as the season progresses based on crop performance and emerging market opportunities. This adaptability could be a key strength when dealing with increasingly volatile weather patterns and shifting grain prices, notes Olivia.

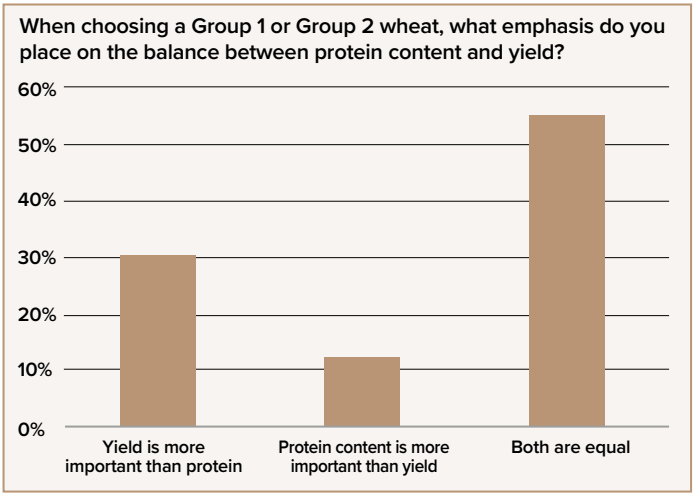
"A variety like KWS Vibe might be one growers taking this approach to nitrogen find particularly interesting," she highlights. "It's a Group 1 which is particularly notable for its strong disease resistance profile, including an 8 rating for yellow rust and a 6.6 for septoria, along with a protein content of 13.2% – the highest on the RL. This makes it a viable option for growers aiming for premium milling markets while maintaining yield security."

Other promising recent varieties from KWS include KWS Equipe and KWS Newbie – both Group 2 wheats with excellent untreated yields and strong disease packages – as well as KWS Solitaire and KWS Flute, which serve the Group 3 biscuit and feed segments. KWS Scope, a Group 4 hard wheat, stands out for leading yields in the West and strong all-around agronomics.

Taken together, the priorities outlined in the survey and the development of new varieties from breeders such as KWS, highlight a UK wheat sector that's both stable and evolving. As growers continue to face volatile markets, changing climate conditions, and evolving disease threats, variety choice remains one of the most important strategic levers available. The takeaway? Wheat's dominance is secure – but the approach to growing it is becoming more sophisticated.

"What we're seeing is that farmers are being more analytical and flexible," concludes Olivia. "They want options that deliver no matter what the season throws at them – and that's where some of these new varieties, including our own, are really going to find their place in the market."





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The variety offering more than meets the eye

Not only does Hexton offer a versatile yet reliable soft Group 4 feed wheat option, but it's also part of a new approach to royalties which strives to deliver commercial fairness to both grower and breeder. *CPM* finds out more.

By Janine Adamson

With such slim chances of market success, plant breeding is undoubtedly a risk-laden sector, yet its R&D pipeline is intrinsically linked to the future prosperity of the UK's arable industry.

At the same time, growers face an increasingly challenging environment, whether that be from dwindling financial support mechanisms, extreme weather events, or ever-evolving pest and disease threats.

But what if there was a method to fairly reward both parties for their investment in a particular crop variety, and thus continue to promote innovative breeding activity in the UK?

According to the Breeders Intellectual Property Office (BIPO)'s Hugh Harley, a new royalty collection approach could deliver just that – based around a unified rate for both certified and farm-saved seed.

"In the past, BIPO operated on a per hectare grown basis and while this was successful, we wanted to create a fairer system whereby all growers have the opportunity to access the latest genetic material, regardless of where the seed is sourced from," he explains.

Simplified approach
According to BIPO's Hugh Harley, the new system is equitable but also simplified, because the grower only has to declare the hectarage for farm-saved seed.

Wide appeal

Although a seemingly natural fit for the North due to its high yields in that region, RAGT UK's Andrew Creasey says as a variety, it offers much more.

"A such, the new system is equitable but also simplified, because the grower only has to declare the hectarage for farm-saved seed meaning less administrative burden when buying certified."

FAIRER APPROACH

Hugh highlights that a key aspect behind the change has been distributing the cost more evenly between certified and farm-saved seed.

"For the grower it's fairer, whereas for the breeder, it's ensuring investment is returned back into what's become a high-risk industry. Everyone contributes fairly to the genetics that'll be essential on farm in the future, regardless of their choice of seed.

"More R&D spend means improved varieties for the grower and they'll then see those benefits on farm in the future," he adds.

Having operated for the past 20 years under its Royalty Area Collection (RAC) scheme, Hugh stresses that the license is evolving and the new royalty collection mechanism is different to what many growers may understand to be BIPO.

"We began by supporting mostly minor crops but now have a more varied list across the board from key breeders. We envisage all new BIPO-listed varieties will be under the new royalty scheme – known as RAC+ – it's straightforward, although it's a shift from how we've operated in the past."

With RAC+, certified seed has the royalty included in the price of the seed from the merchant. Whereas for farm-saved seed, the royalty is invoiced by BIPO on the area declared by the grower.

According to Hugh, an added benefit of the BIPO license is that it offers full traceability for the end user, an aspect gaining traction within the supply chain. "It's certainly something we're seeing greater interest in from processors and manufacturers. By conducting randomised audits, we can confirm traceability with full transparency," he comments.

One of the first varieties to be included in BIPO's new RAC+ scheme is soft Group 4 feed wheat RGT Hexton, which has recently been fully approved for distilling.

Although a seemingly natural fit for the North due to its high yields in that region, RAGT UK's Andrew Creasey says as a variety, it offers much more. "Hexton is the highest yielding soft Group 4 approved for distilling. It delivers a UK yield of 105 (treated) and an exceptional 111 in the North, so is a significant step up in performance compared with a popular equivalent variety.

"However, we believe the story is bigger than that and as such, Hexton offers widespread appeal across the UK ▶

Consistent performance

At a time where the disease susceptibility of several varieties seems to be shifting, RAGT UK's Ed Stanford highlights that Hexton's performance has remained stable.

How BIPO's RAC+ works

The collection mechanism has changed for the better, believes BIPO

The Royalty Area Collection (RAC) is a license between the breeder and the farmer who wants to use a protected variety. By signing it, the farmer agrees to pay royalties at an agreed rate.

Until last autumn, BIPO's RAC scheme operated under a per hectare basis for both certified and farm-saved seed, with the rate being the same for both.

In this system there was no royalty attached to the sale of certified seed, instead it was the grower's responsibility to declare the planted area and pay a royalty rate accordingly, explains BIPO's Hugh Harley. "Similarly, the following years the grower would be sent a declaration form to note any areas planted with certified seed of the variety, and any areas of farm-saved seed from the previous year's crop."

With the new RAC+ system, certified seed now has a royalty attached (for example, £95 for RGT Hexton), meaning the farmer doesn't have any costs following the invoice from the seed merchant.

"When they're sent a declaration from BIPO, they simply state the tonnage purchased and from which merchant. Then, when the farmer declares a RAC+ variety with farm-saved seed, he simply enters the area planted and BIPO invoices the grower on behalf of the breeder," adds Hugh.

"The rate is unified between the two, although it can of course vary due to sowing rate per hectare. For example, 5ha/t of seed – 5 x £18/ha = £90 for farm saved-seed planting of Hexton."

All BIPO-listed varieties are covered by one licence which remains valid until a farmer no longer uses those varieties, when it can be cancelled.

New thinking
RAGT UK's Helen Wilson hopes that by being the first plant breeder to commit to RAC+, it'll encourage a new way of thinking where varieties are selected based on their merits.

for a breadth of different scenarios."

Developed at RAGT's breeding station at Ickleton by breeder David Schafer, Hexton was one of only two new feed varieties to be recommended by AHDB for its 2025/26 list. Among its stand-out features is a septoria score of 6.7, which is again a significant improvement compared with the existing material in the Group, says Andrew.

Its yellow rust score is 7, mildew a 6 and brown rust a 5. Hexton is also resistant to orange wheat blossom midge – a prerequisite for the increasing number of growers aiming to avoid insecticide use, he reminds.

However, what may come as a surprise is the variety's performance when in a second wheat scenario. "Our trials indicate on average, Hexton can achieve UK treated yields of nearly 108% when planted in this slot. In fact, that's better than when it's sown as a first wheat," states Andrew.

"This is important as the UK's oilseed rape hectarage continues to decline, plus a distinct lack of suitable, profitable break crop options. As a result, growers may find themselves having to include more second wheats in their rotations."

He adds that equally, Hexton suits relatively early sowing from Mid-September onwards. "It's a slow developing variety so avoids being forward over winter, plus has a maturity score of +2, hence it suits an earlier position. This is backed by good lodging resistance with (7) and without (7) PGR," he explains.

As for soil type performance, Hexton is providing consistency across a range of classes, points out Andrew. "But what we do know is it's particularly effective on lighter soils, again, an attribute which means Hexton has flexibility and is beyond simply a variety for the North."

He stresses it offers much more than the obvious. "Hexton provides growers with a solution for a range of different rotational challenges, whether that's addressing a second wheat slot, having to drill early, or ensuring performance on lighter soils. Yes it seems like an obvious contender for the North, but it shouldn't be pigeon-holed."

CONSISTENT PERFORMER

At a time where the disease susceptibility of several varieties seems to be shifting, RAGT UK's arable product manager, Ed Stanford, says he's pleased that Hexton's performance has remained stable.

"We've seen Hexton perform as we expected throughout this season so far. In a year with new yellow rust pressures in the North and East of the country, it suggests farmers can rely on Hexton to deliver."

> *"Hexton offers widespread appeal across the UK for a breadth of different scenarios."*

But why has RAGT decided to be part of the new RAC+ scheme? Managing director, Helen Wilson, says the company's involvement with BIPO began with its former system, as a means of protecting the breeder's BYDV-resistant varieties such as Goldfinch.

"We wanted to protect that trait because as a company, we invest around 18% of our turnover back into R&D to enable innovation, which ultimately is to benefit farmers," she continues.

"Despite this investment, the disparity between farm-saved and certified seed has been getting greater, meaning less money is being returned to support that critical development work."

Helen hopes that by being the first plant breeder to commit to RAC+ with Hexton, it'll encourage a new way of thinking where varieties are selected based on their merits, rather than the lure of a cost-saving exercise.

"And in doing so, we're supporting the UK seed industry as a whole and hopefully safeguarding that R&D pipeline."

Ed highlights that although there's always an element of risk when backing something new, to give RAC+ a fair shot, the company had to put forward a high performing variety.

"For people to buy into the principles of RAC+, it had to involve a special variety worth growing in the first place, hence why we've chosen Hexton. We want to encourage growers to adopt the system," he explains. "Equally, we're pleased to be taking our involvement with BIPO beyond simply trait protection."

As for the future and licensing of pipeline varieties, Helen admits it hinges on the uptake of Hexton. "At the moment there remains a lot of unknowns. But what we are certain of, is plant breeders can't continue to invest without a level of return on that investment.

"It's a long-term game – we're constantly seeking new traits and resistance mechanisms to meet future demands while trying to predict what growers may require. It'll be interesting to see if other breeders also opt to join RAC+ and therefore help to move the scheme forward," she concludes.

An alternative choice

Deciding on a variety is a highly personal thing, dependent on the requirements of both an individual farm and its preferred management system. *CPM* investigates one option which is proving a hit among regen adopters.

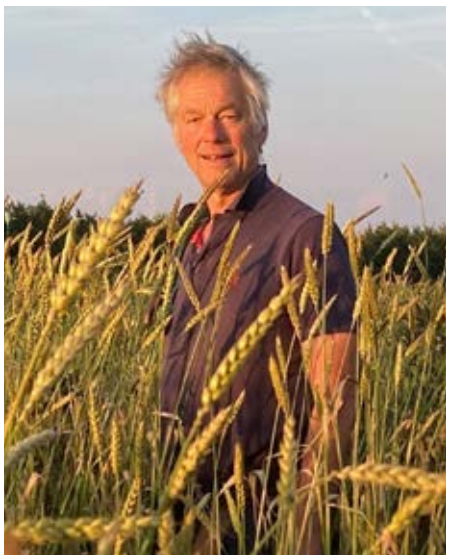
By Janine Adamson and Rob Jones

While securing as much market share as possible with a variety is undoubtedly a goal for most plant breeders, with no two farms the same, offering a range of options is arguably just as important, particularly from a grower's perspective.

As well as considering factors such as geographical location, soil type and chosen end market, approach to crop management also varies greatly, meaning it's never as easy as simply selecting the top yielder.

In the case of Group 2 winter wheat Mayflower from Elsoms Seeds, an untreated yield of 91% plus an 8.9 score for septoria has found the variety gaining popularity among growers looking to adopt practices associated with regenerative farming.

One such grower is Dorset-based Dougal Hosford who first grew Mayflower in readiness for Harvest 2024, drilling the variety on 20 October the previous year. He says the crop achieved a yield of 8.4t/ha and was managed without fungicides,



Variety choice

Grower Dougal Hosford believes a key building block for regenerative systems is selecting varieties which are capable of producing good yields from a reduced input programme.

Growing popularity

An untreated yield of 91% plus an 8.9 score for septoria has found Mayflower gaining popularity among regen farmers.

▶ insecticides, PGRs or autumn herbicides.

It delivered a specific weight of 78kg/hl, and with all of this in mind, Dougal says he's chosen to drill Mayflower again for Harvest 25.

"For us, regenerative farming is all about prioritising the health of soil. Yes we have to ensure we grow profitably, but the idea of reducing fungicide inputs shouldn't be an alien concept given we know synthetic fungicides are likely to harm the naturally occurring fungi in the soil," he explains.

"Equally, soil health is driven by fungal content so maintaining the fungal:bacteria ratio of any given soil is key. Fungi enhance a soil's ability to recycle nutrients, increasing their availability to the crop, and are a vital element of the soil microbiome."

Dougal adds that as a business, they've been experimenting with reducing nitrogen and fungicide inputs for around five years, gradually moving from a 4-spray strategy to a 1- or 2-spray approach depending on disease levels.

In fact during the past two years, in some cases, no fungicides have been applied at all. "Although our soil health has improved, overall results have been mixed with some of the better performing septoria-resistant varieties tending to do less well against rust when we've applied no fungicides.

"As such, a key building block for regenerative

systems is selecting varieties which are capable of producing good yields from a reduced input programme. With a high untreated yield of 91%, very high resistance to both septoria and yellow rust, and with the ability to produce a higher protein percentage in its grain compared with most other varieties grown at the same nitrogen rates, Mayflower's sustainability credentials are hard to ignore," stresses Dougal.

He adds that the variety's disease resistance scores seem to be holding up well year-on-year according to the RL. "That's a big plus given the usual trend is for ratings to slip back as varieties begin to break down to key diseases.

"For this year's crop we've also cut nitrogen back slightly to 150kgN/ha, and with the dry spring weather until recently, disease pressure has been low. However, we did have to apply a low cost fungicide at around T2 to control rust."

EASY GOING

Dougal believes that for any farm considering a regenerative approach, Mayflower should offer a lot of what's required. "It's agronomically easy to manage, strong on septoria resistance and has adapted extremely well to a restricted input programme so far.

"However for balance, I must add that we've only taken it through one full crop year, so we'll certainly know more about it by September," he points out.

Matt Fuller of Heathcote Farms in Toddington, Bedfordshire, is cropping 1000ha – half of which is milling wheat, grown mainly as first wheats.

He highlights that although he's reasonably comfortable with the word 'regenerative', it really shouldn't be classed as a new concept. "This is given the historical importance many farmers have always placed on prioritising soil health to help obtain the best performance from the crops they grow.

"Heathcote Farm has been successfully incorporating regenerative farming techniques into rotations for a number of years, well before regen farming was being hailed as a new concept. Part of the profit we've made from our crops has always gone back into reinvestment on soil conditioners and composting, both key strategies for improving soil health," explains Matt.

> *"It's agronomically easy to manage, strong on septoria resistance and has adapted extremely well to a restricted input programme so far."*

The farm first identified Mayflower in early 2023, shortly after it had arrived on the RL. "The obvious attraction was its overall disease package with a 9 for yellow rust and at that point, an 8.4 on septoria which has since climbed to 8.9.

"With 500ha of winter wheat to manage we want to spend as little time as possible chasing disease, particularly when the block of Mayflower we're currently growing is eight miles from the main farm site.

"With a final yield of 11.59t/ha ▶

Outstanding performance

With a final yield of 11.59t/ha from the farm's first crop of Mayflower, Matt Fuller says it was their highest yielding milling wheat last year.

Mix and match

Selecting four varieties is helping one grower to spread harvest workload and manage silage requirements

Spreading risk
Having four varieties helps to manage disease risk, such as this year when a new race of yellow rust threatens to rip through crops, suggests Matthew Tidball.

Although 80ha of winter wheat may be perceived by some as modest, rather than put all of his eggs into one or two baskets, mixed farmer Matthew Tidball has opted to split the area across four varieties.

He says as with many growers, he seeks to keep on top of field work. But, his motivations are perhaps a little different to those of a typical arable farmer. While he aims to push for crop yield and understands he can only get out what he's prepared to put in, with 80ha of grass to mow, it can prove a juggling act.

"I try to get all spraying and fertilising done when it's required. I have to push these crops if they're to perform well, but I also have to make sure tasks like the T2 spray are well-timed, not just robust," comments Matthew.

Then with grass to mow for silage once spraying his crops is finished, he can't afford to be late taking a cut otherwise sugars could be lost to seed, he points out.

Across two farms roughly six miles apart outside Cullompton, east Devon, the rotation is focussed on winter wheat with maize as the break crop and grass leys for silage.

The arable enterprise sits alongside 400 store cattle, a pig finishing unit and, what Matthew describes as, 'a few sheep too'.

The wheat area comprises four varieties: SY Insitor, Fitzroy (Secobra), Graham (Syngenta) and KWS Palladium. He says all were chosen for being dependable all-rounders, although Fitzroy takes half the area because it offers added flexibility.

"Fitzroy does well as either a first or second wheat, has good autumn vigour which suits us because drilling can easily run into mid-November after maize or when we have a wet autumn as we did in 2024, and is tall but stiff. It has the flexibility to fit our system," notes Matthew.

"Although the fungicide regime is much the same as other wheats on the farm, its disease resistance especially to septoria means it could tolerate a lower input regime, however,

> *"I want my crops to yield; you can quickly lose a lot more than you can save with low input programmes."*

I want my crops to yield. You can quickly lose a lot more than you can save with low input programmes."

This is the third year he's grown Fitzroy with it replacing a very popular, high yielding Group 2 variety. "That always looked great in the field, but it disappointed once the combine went in," he says.

Harvest scheduling is another consideration which influences the farm's variety choice. Although travelling between the sites takes less than an hour by tractor, the narrow lanes of rural Devon mean the combine harvester wants to be moved as few times as possible, adds Matthew.

"It's just so much easier if we can finish one block of land before moving the operation to the other farm. Having four varieties helps to stagger harvest and manage our disease risk, such as this year when a new race of yellow rust threatens to rip through crops," he adds.

Across the two farms soils range from heavy clay to light sands, but the more immediate challenge is field size, the biggest being just 10ha. "Most of our arable area can be thought of as headlands and these are rarely your best performing areas of a field.

"Despite this, our average wheat yield is 8.85t/ha which I believe endorses my philosophy of pushing crops," concludes Matthew.

▶ from our first crop of Mayflower in 2024, it was our highest yielding milling wheat last year and, in a tough year for protein levels, its 12.3% was more than acceptable."

For the upcoming Harvest 25, Matt says he's increased the area of the variety slightly to 72ha, established on chalky soils on a site where high yields have been recorded historically. "The drier conditions until now have helped to reduce disease pressure this spring and Mayflower was looking green and lush on 12 May when we applied a T2 of Ascra Xpro (prothioconazole+ bixafen+ fluopyram) at 1.5 l/ha with some liquid manganese.

"The lower disease pressure has allowed us to scale back fungicide inputs and focus on the application of biostimulants and crop nutrition. Overall, Mayflower has received four nitrogen splits totaling 230kgN/ha; while some of our other milling varieties are under pressure from new strains of yellow rust, Mayflower is still looking remarkably clean."

If Mayflower yields well and records protein levels of 12.5%, Matt believes he'll drill it again for next season. "As a variety it fits our September drilling window, stands well, shows good vigour particularly in early spring, and is easy to manage.

"For anyone looking for a high output-low input winter wheat to grow within a regenerative-style system, Mayflower is worth considering," he concludes. ●

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Harnessing the hybrid benefits

During a season where the fortune of oilseed rape has the potential do a complete 180, plus uncertainties regarding SFI, could the agronomic benefits of hybrid barley suddenly come into their own? *CPM* speaks to advocates of the crop to find out more.

By Janine Adamson

Although this season's crop of oilseed rape isn't fully over the line just yet, a solid performance could be just what's required to shift grower attention back to this valuable break option. However with this comes wider rotational challenges, namely selecting an appropriate entry crop to facilitate OSR's early drilling window.

According to ProCam's seed manager, Lee Harker, this could mean it's time for barley to take the spotlight – a crop which has suffered by proxy as a result of the UK's declining OSR area. "One good year is unlikely to instill complete trust in OSR, but with a promising crop in the ground we may find a steady increase in plantings next season onwards.

"Of course this means growers require the flexibility of an earlier preceding harvest. Coupled with the uncertainties surrounding SFI in the rotation, the obvious contender is barley," he believes.

TECHNICAL MERITS

A self-confessed advocate of the crop, Lee says barley has a valuable place, even more so if it's a hybrid variety. He says this viewpoint is based on its technical merits. "Growing hybrid barley is an agronomic decision because it contributes so much to the wider rotation whether that's grassweed suppression, being a good entry for OSR, or providing an additional income from straw," he adds.

But what is it about hybrid barley that enthuses the experts so much? Syngenta's Ben Urquhart says many of the crop's benefits are a result of heterosis, also known as hybrid vigour. "This is where the progeny of two genetically dissimilar parents exhibits increased biological function, compared with each parent.

"In many cases this produces a yield advantage which can be attributed to factors such as greater plant resilience and disease resistance, and increased above and below ground biomass," he explains.

This is particularly valuable given the UK appears to have a 'new normal' when it comes to weather patterns, says Lee. "Hybrid vigour enables the

Increased resilience
According to ProCam's Lee Harker, hybrid vigour enables barley to better withstand variability, whether that's a wet autumn or a dry spring.

Grassweed suppression

Research indicates surviving grassweeds post-hybrid barley are often smaller and reduced in viability, highlights Syngenta's Ben Urquhart.

crop to better withstand variability, whether that's a wet autumn or a dry spring.

"Because hybrid barley develops a bigger root mass than conventional barley, plants scavenge for both water and nutrients more effectively. The crop is in a better position to handle those extremes and bounce back from adversity."

Another important factor for Lee this season is the performance of hybrid barley in high grassweed pressure scenarios, given growers may be on the back-foot following consecutive years of poor control. He adds that with the future unknown for certain herbicide active ingredients, implementing an integrated approach will be critical.

"Particularly if you compare with a second wheat, for example, hybrid barley is much more effective at smothering grassweeds – not just blackgrass – and therefore offers a level of suppression."

Ben confirms: "As well as being highly competitive compared with conventional barley and wheat, research indicates surviving grassweeds post-hybrid barley are often smaller and reduced in viability. So you're almost achieving a double hit of suppression," he suggests.

This trait is something Syngenta actively prioritises when screening new varieties, highlights Ben, as was the case when bringing six-row hybrid SY Canyon to the market. "Our aim has been to select the most competitive varieties, whether that's above or below ground.

"Equally, we've made a conscious effort to overcome what's been coined hybrid barley's Achille's heel – specific weight. Canyon bucks this trend, delivering the highest specific weight (71.1kg/hl) for a six-row variety on the AHDB Recommended List for winter barley 2025/26."

ALL IN ONE

In fact, Canyon's specific weight is in the top three of all winter barley varieties on the RL across the three groups, he adds. And contrary to hybrid barley of the past where high specific weight often didn't translate to yield, and vice versa, Canyon offers both.

"Having combined both high yield (91 untreated) and good specific weight in one variety is a particularly attractive combination," states Ben.

Lee says he's been impressed with the variety so far since it joined the RL in 2022. "Canyon's specific weight definitely has appeal, particularly for mixed farmers who are farm-saving seed – a bold grain is attractive in those instances.

"In the past there was a belief that hybrid barley grain was poor, but that's ▶

▶ certainly no longer the case. And because Canyon offers a high yield too, this mostly covers the additional seed cost which comes with selecting a hybrid variety."

Canyon's other features include scoring a 7 for both mildew and rhynchosporium, a 6 for brown rust, and a 5 for net blotch. It's also a relatively tall variety, offering an average straw length of 116cm without PGR and 108cm with PGR.

With barley straw highly desirable, particularly for those operating mixed systems, Lee says this should be factored into crop margins.

As for being an entry for OSR in the rotation, Canyon is early maturing (-1) which also means growers may benefit from spreading their on-farm workload. Whereas being a hybrid variety, it can be easily harvested as wholecrop for added market flexibility, highlights Lee.

Ben agrees that this is a valid point. "We're seeing an increase in growers wholecropping hybrid barley for the biogas market because in many ways, it's in a similar league to hybrid rye, while offering a viable alternative to maize."

One grower who's remained committed to hybrid barley for the past 10 years or so is Darlington-based William Maughan. Operating a 200ha mixed system including 30,000 free-range hens, 200 beef cattle and a cereal-based cropping rotation, he says unlike his wheat yields which have plateaued lately, the farm's winter barley is on an upward trajectory.

"During our time growing hybrid barley, we've taken advice on-board regarding the importance of early nutrition and I believe that's helped us to boost the yields, alongside careful variety selection," he continues.

Being a mixed system, the main purpose of the farm's cropping is to meet the forage requirements of the cattle. "We harvest hybrid barley using a mix of three techniques: wholecropping headlands, crimping the centres of fields at high moisture before rolling and clamping, and then some dry rolling.

"We also choose to grow a combination of 2-row and 6-row varieties, adopting a 50:50 split between the two," adds William.

The reason behind these management decisions is two-fold – namely to produce optimum forage, but to also reap the agronomic benefits of hybrid barley. "Although we're a mostly clean farm in terms of grassweed pressure, where we do have a problem, I find the 6-row varieties are excellent at smothering weeds including volunteer wheat. They also seem the best for crimping and clamping.

"Whereas 2-rows produce big and bold grain plus are more suitable for land which is particularly fertile to avoid lodging risk," he explains.

Like many farmers, William is conscious that the 6-row varieties of the past were often criticised for smaller grain, therefore he takes time to scrutinise aspects such as specific weight. He says his recent choices have been Canyon and also KWS Inys, both selected for their bold grain size. ●

On the up

Unlike the farm's wheat yields which have plateaued lately, William Maughan says his winter barley is on an upward trajectory.

Making a name for itself

A variety doesn't have to be new to the market for it to have merit that may have thus far gone underappreciated, as *CPM* finds out when it takes a closer look at LG Capitol, a two-row winter feed barley.

By Melanie Jenkins

The 'capitol' is often associated with a US building where Congress meets to set out legislature, and can be referred to as 'the Capitol', 'the Capitol Building', or 'Capitol Hill', but Limagrain's version is a little different and could be said to reside on a hill all of its own.

Sitting comfortably in the top three conventional feed varieties on AHDB's Recommended List, LG Capitol is a high yielding winter barley with a combination of strong specific weight and a good disease resistance profile.

Although Capitol isn't new to the RL – now in its second year of recommendation – its consistent position as one of the top yielding two-row winter barleys means it very much has a place on farm, says Limagrain's Ron Granger.

"A sister variety to LG Caravelle, Capitol came along a year behind with very similar yield and slightly lower disease score, however, it's still a stand-out variety for the market."

According to Wynnstay's Joe Wood, it's hard to overlook Capitol's high yield. "It's a headline feature and it performs across all regions which is the kind of versatility the industry requires.

"We have growers with the variety from the tip of Cornwall, into West Wales and to the Scottish Borders, and there have been no issues with it. Even last year, which was very difficult for a lot of growers, Capitol produced good yields."

RELIABILITY

The key with Capitol, is that it's demonstrated several years of consistency throughout national trials testing prior to RL recommendation, and the variety has since produced two years of reliable performance on farm, explains Ron. "It's shown high consistency of annual treated yield between 2021 and 2024, with figures of 105%, 106%, 105% and 105%, in annual treated trials respectively, and its UK score on the RL for 2025/26 sits at 106%.

"We've had difficult and varied seasons during this time, ranging from droughts to extreme rainfall, but Capitol has performed well across regions and soil types, making it a consistent and resilient choice for farmers. And I believe this is something we, as breeders, are getting better at achieving with our varieties," he says.

Limagrain breeder, Sophie Buon, points out that Capitol performs well on heavy soils especially. "It's the best variety on the RL for heavy soils and does even better than Caravelle, at 110% of control."

In line with this consistency is Capitol's high untreated yield at 90%. "This gives growers some peace of mind that the ▶

A strong position
LG Capitol is in its second year of recommendation and maintains a consistent position as one of the top yielding two-row winter barleys, says Limagrain's Ron Granger.

Consistent performance

Despite difficult and varied seasons between 2021-2024, ranging from droughts to extreme rainfall, Capitol has performed well across regions and soil types.

▶ variety will still deliver when they can't access land at the ideal time to apply fungicides," adds Ron.

Capitol's untreated yield is supported by strong agronomics which make it a low maintenance variety, believes Joe. "The high untreated yield is a trait that originally attracted Wynnstay to the variety.

"This score is more representative of what can happen on farm where, for example, extreme wet periods can often impact T0, T1 and the early spring fertiliser applications. So by having a variety with a strong untreated yield, this provides reassurance for growers."

According to Ron, Capitol has good standing ability, strong grain quality at 69.9kg/hl, with respectable screenings. "It has all of the desirable attributes that make up a good two-row feed variety.

"Its grain is large and bold which is something people may not realise, but I think it's a great attribute to have. This means when we have drier seasons, or when it's grown on lighter medium soils, the variety still tends to perform well because this larger berry size will pull the variety through and allow it to achieve better yields."

Dalton Seeds' David Huish has also been impressed with Capitol. "From my experience it maintains good standing with a lodging score of 7 and an average straw length of 88cm, although I think it may generally be shorter than the RL suggests."

Wynnstay was keen to determine if there was a lodging risk with the variety but has confirmed that the straw stands well, says Joe. "The only area of management to focus on is to encourage yields through optimising fertiliser timings – this will help you achieve the most from the crop."

A further feature of the variety is its straw yield, says Ron. "We mustn't underestimate the importance of this factor. Everyone talks about wanting taller varieties, but

Drilling flexibility

Dalton Seeds' David Huish believes Capitol could be drilled from around 15 September, giving growers more flexibility if required.

I've observed during the past few years that varieties like Capitol and Caravelle tiller more than older varieties.

"It's not just about the height, it's also about the number of tillers a variety has which contributes to both grain and straw yield. In a year like this where we've had drought conditions, we could see straw increase in price, so it's valuable to have higher straw-yielding varieties.

"Maintaining tiller numbers is the priority with winter barley and to do this we've found that early applications of nitrogen are beneficial, just like for hybrid barley," suggests Ron. "Further to this, there are seed treatment and foliar products to both encourage root mass and maintain tiller numbers which is especially important when plants may come under stress in the more testing soil types."

In terms of drilling window, David believes Capitol could be drilled a week earlier than Caravelle. "I believe it could go in from around 15 September, giving growers more flexibility if required."

Due to the decreased oilseed rape area, this year particularly, there's been a reduction in the amount of barley planted, says Joe. "It's been a tricky market and where we've had wet autumns leading to growers focusing on planting wheat, where arable land has been placed into SFI, plus the feed value hasn't been very encouraging, this has all had a knock-on effect on the amount of barley being drilled.

"But it's always a cyclical process and the less barley in the ground, the more desirable it becomes to buyers."

Ron believes that if the weather is favourable this year, then there could be more OSR planted again which may result in more winter barley in rotations. "When this happens, cereal ore livestock farmers are going to be looking for resilient varieties with strong disease and grain quality, something that won't let them down and will deliver on straw."

PIPELINE TRAITS

As for what could be next in the barley variety pipeline, Joe hopes to see rarer genetics introduced for disease or virus control, such as increased BYDV tolerance. "I think this gradually has to become more prevalent which will result in a host of new two-row varieties coming onto the list.

"We don't want to lose sight of having a stable and reliable crop but the more we can achieve genetically to take the pressure off sprays and seed treatments, the better."

Sophie confirms that breeders are focused on producing varieties with BYDV tolerance and resistance. "The current challenge is working to stack the particular genes involved to build a greater tolerance and help cut the use

Yielding well

Even last year, which was very difficult for many growers, Capitol produced good yields, observes Wynnstay's Joe Wood.

The performance edge

Consistent performance, strong yields and specific weights make LG Capitol top choice

LG Capitol has proven a hit for F. C Palmer and Sons, where it's performed consistently during a number of seasons, producing more than favourable yields. Running a family farm near Ely in Cambridgeshire, Luke Palmer works predominantly fen soils with heavier land intermixed. "We have a diverse range of cropping including wheat, barley, peas, beans, sugar beet, potatoes, celery, lettuce, turf and alternative crops."

While growing barley for seed around four years ago, Luke observed that conventional varieties were outperforming hybrids on his land, so he focused on growing Bolton, followed by LG Caravelle.

"Three years ago I grew both Caravelle and Capitol and because Capitol performed better, I decided to grow it exclusively last year, but this year I've also planted some Craft."

Luke particularly appreciates the wide drilling window which Capitol offers, allowing him to plant it into December and still achieve reasonably high yields.

While all cereals on farm are essentially breaks to reset the land for root crops, winter barley's importance extends to spreading the workload. "I grow it almost exclusively for seed which allows us to empty the sheds and puts cash in the bank early before the main event of harvesting milling wheat and wheat for seed."

Additionally, growing winter barley also means Luke can spread his sprayer capacity, which is especially helpful because of the catchy local weather conditions.

"I'm a strong believer in not applying too much of insecticides on farm.

"We're also exploring increased rhynchosporium resistance, improved nitrogen use efficiency and are working to create varieties better able to tolerate extreme weather and climate change. During the past few years we've increased the number of nurseries we're operating to enable us to explore these traits further."

As breeding technologies advance, newer varieties will be entering the market faster. For example, Capitol took six years to reach the market from when it was first bred, whereas previously it would have taken eight years, explains Sophie.

"Because we're now using genomic selection, we can predict which varieties will perform best when they're young and this is then confirmed in the field. Capitol was one of the varieties which looked outstanding from an early stage and has proven to perform consistently since, which is down to genomic selection.

"So the quicker we can select varieties using genomics, the faster we can react to what farmers require and to climate change."

The versatility of Capitol across all regions and soil types is something Joe believes should be highlighted. "We deal with a range of growers; from large arable units in the East to dairy and sheep farms in Wales, so we want to promote varieties like Capitol, which are suited to both light and heavy land.

"I believe if growers gave it a shot, then the chances are they'd be opting to grow it again the following year because it really is a strong variety." ●

Over and above

Despite several challenging seasons, F. C Palmer and Sons' crops of Capitol have consistently achieved better yields than the farm average.

nitrogen, with winter barley usually receiving around 70kgN/ha, and some fields this year only having 45kgN/ha. My crops seem to perform well without more than this which is positive because of the savings in both cost and time."

Calling himself as an 'advantageous tiller', Luke uses the cultivation method most suited to the field and conditions at the time, meaning Capitol will have been drilled into different seedbeds, using either a direct tine drill or a power harrow disc drill.

In a similar approach, he applies inputs based on the season. "This year Capitol has had Miravis Plus (pydiflumetofen) at T1 and Elatus Era (benzovindiflupyr+ prothioconazole) at T2."

Despite several challenging seasons, Luke's crops of Capitol have consistently achieved better yields than the farm average, and even in 2023 when yields were down across the board, it outperformed the SY Kingsbarn that he grew.

"Capitol has just had the edge for us; producing a bolder sample and much better yields, so it's a variety I really like."

LG Capitol at a glance

Gross output (% treated controls)	
UK treated	105.7
East region	107.4
West region	[104]
North region	105.1
UK untreated	89.6
Agronomics	
Specific weight	69.9
Resistance to lodging without PGR	7.2
Resistance to lodging with PGR	7
Straw length without PGR (cm)	88.5
Brackling (%)	12.1
Ripening days (+/- KWS Orwell)	0
Disease resistance	
Mildew	6.4
Brown rust	7.1
Rhynchosporium	6
Net blotch	5.4

Source: *AHDB Recommended List, winter barley 2025/26 – [] = limited data.*

Selecting the crème de la crème of OSR

With many of the challenges facing oilseed rape occurring during the critical establishment phase, what must a variety offer to support the crop to achieve its potential? *CPM* takes a look at some of the options at the top of their game.

By Janine Adamson

Despite so much being stacked against UK oilseed rape, grown well, it continues to offer a raft of benefits to an arable rotation. However, by being so risk-laden from the off, this places additional pressure on selecting the optimum variety to boost OSR's success rate from the moment the seed is in the ground.

With new releases from plant breeders added to the AHDB Recommended List each year, arable technical manager for Openfield, Duncan Durno, says truly understanding the importance of variety choice within today's climate is critical.

Furthermore, it's this insight which steers the selection process when it comes to curating their portfolio. "With a distinct lack of viable alternative break crops, most growers would ideally like to reintroduce an area of OSR back into their rotations if they're not growing it already," continues Duncan.

"This may be helped by the fact this season's plantings are in better condition than we've seen for several years, namely due to improved

Set specification

Openfield doesn't introduce an OSR variety to its portfolio unless it meets a strict set of criteria centered around genetic traits and gross output, highlights Duncan Durno.

Strong agronomic package

Limagrain's Florentina Petrescu says the breeder calls LG Armada a fully-loaded variety because it comes with a 'seriously strong agronomic package'.

establishment from better drilling conditions and reduced cabbage stem flea beetle numbers.

"However, the industry is fully aware of the risks during establishment, some which are beyond the grower's control, so the varieties of today must mitigate those factors as much as possible right through the growing season. Subsequently, we must ask – what is it that we now require from a variety?"

According to Duncan, Openfield doesn't introduce an OSR variety to its portfolio unless it meets a strict set of criteria, centered around genetic traits and gross output. The first factor the team considers beyond yield is growth habit.

This is because autumn vigour is essential to give the crop its best chance of establishing successfully and growing through its most vulnerable stage. "As establishment is the time when crops are at the greatest risk of being lost, we're looking for a strong growth habit during that autumn period," comments Duncan.

Equally, this must translate through to the spring, he adds. "Along with a good plant structure, we know that spring vigour and robust growth are essential to help reduce the effects of CSFB larvae."

The next factor to consider is drilling window, he adds. "A flexible drilling window is key to ensure OSR can be planted into optimum seedbed conditions rather than adhering to a set calendar date, which may have been the case in the past. Growers have to be able to pick and choose when they sow rather than be dictated to by a variety."

If soil and weather conditions come right early in the drilling window, strong disease resistance and lodging resistance are essential, points out Duncan. "As with any crop, drilling early leaves it more susceptible to disease, in the case of OSR that's verticillium wilt and stem canker. Conversely, if conditions don't come right until later in the season, vigour and winter hardiness become even more important."

With these criteria in mind, which varieties have successfully made it through Openfield's screening process? Duncan says a hybrid option which has impressed both him and the co-operative's customers is LG Armada. "I believe LG Armada offers the best yield and trait combination available, as well as ticking all of our boxes.

"It has fantastic autumn and spring vigour as well as strong foliar disease resistance, verticillium wilt tolerance and stem health traits making it very flexible with regard to drilling date."

YIELD PRESERVATION

According to Duncan, the variety's trait package helps to protect its inherent yield potential throughout the growing season, with Limagrain's Sclero-flex trait adding tolerance to sclerotina and pod shatter protecting yield right through to harvest.

Limagrain's OSR and sunflower product manager, Florentina Petrescu, believes Armada is one of the top hybrid varieties in the UK for a good reason. "We like to call it a fully-loaded variety because it comes with a seriously strong agronomic package.

"One of the standout features of Armada is its impressive autumn growth – it establishes well and quickly, giving farmers more flexibility with their drilling window. Then come the spring, it really kicks into gear with a vigorous growth habit which is especially useful when pests become a problem, and crops need to bounce back fast."

Florentina adds that on the disease front, Armada scores well: phoma stem canker (6), light leaf spot (7), and good tolerance to verticillium. "Farmers also appreciate its strong resistance to lodging [8] and pod shatter – both crucial for securing yield right through to harvest. Pod shatter is increasingly essential on farm as we see more volatile weather patterns across the seasons."

She says most importantly, Armada has shown consistency, with a high gross output across all UK regions. "It's a variety that performs well on farm. It's clean, vigorous, and dependable with the yield potential to match."

Firmly in agreement is Gloucestershire grower Ed Horton of SS Horton and Sons, a 3800ha mixed system near Cirencester. Despite the difficult, wet conditions of last spring, the farm achieved its all-time record OSR yield of 5.1t/ha at Harvest 2024 with a crop of Armada. "Our long-term OSR average is around 3.9t/ha so Armada delivered a significant step up even when conditions were poor," he says.

Opting to sow later – around the second or third week of September – using a Horsch Avatar into cooler, thinner soils, Ed adds that he's found Armada has very good establishment. "Our seed rate is also low – 35-40 seeds/m^2 to avoid an overly thick canopy.

"With Armada, it creates great canopy depth, allowing sunlight all the way through to the lower leaves. And with its strong foliar disease resistance including Sclero-flex, we didn't have to apply any fungicide to our OSR last season and still achieved that top yield."

According to Ed, his success with OSR has mainly been down to the farm adopting an integrated approach ▶

Phoma blocker

DSV Dompteur features the breeder's new phoma blocker trait which combines two complex phoma resistance genes, explains Sarah Hawthorne.

Spring vigour

KWS Domingos has very quick spring vigour allowing the variety to grow away from potential CSFB larval damage or any adverse conditions experienced over winter, says Rory Hannam.

centred around nurturing biodiversity to encourage beneficial insect predators such as parasitic wasps. As such, pressure from cabbage stem flea beetle is now barely negligible and crop management can be insecticide-free.

Nutrition is finessed to maximise uptake, applying a maximum of 175kgN/ha through a range of sources including solid and liquid sulphur and solid and liquid urea. Companion cropping has also been used for the past 10 years utilising a buckwheat, berseem clover and crimson clover mix drilled at the same time as OSR.

With Armada proving a hit, Ed has planted 400ha this season with 350ha planned for next year. "We have a very diverse rotation including winter wheat, winter barley, spelt, oats, beans, peas, rye, triticale and some minority crops for seed such as phacelia and turnips.

"Having a variety like Armada certainly helps us to continue to believe in OSR as part of that cropping mix."

New to Openfield's portfolio this season is DSV Dompteur, which Duncan says again fits all of the criteria while being the highest yielding 2025 candidate variety (111% UK gross output). "Dompteur has all of the yield-supporting traits that we seek plus a flexible drilling date and a growth habit to complement," he points out.

Something which will undoubtedly be commended by the industry, is that the hybrid variety features DSV's new phoma blocker trait. Marketing and sales manager, Sarah Hawthorne, explains this combines two complex phoma resistance genes – RLMS and RLM7 – to provide the plant with added protection against varying phoma strains.

"But equally it's an 'all-in' variety – it really does have everything. From high oil content (46.3) to strong pod generation, I personally believe it's the best OSR variety DSV has bred in the past 10 years," she suggests.

Another benefit is Dompteur's excellent NUE function, enabling a crop to make the most of soil-based nutrients, higlights Sarah. "With increasing volatility in synthetic inputs, both pricing and availability, we're finding this is becoming an increasingly important factor when growers are considering varieties."

RESISTANCE RATINGS

Resistance scores-wise, Dompteur ranks an 8 for light leaf spot and has proven to perform well in verticillium wilt trials throughout Europe. It also carries the pod shatter resistance gene, which Duncan stresses is a non-negotiable for Openfield's OSR portfolio. "It's a must – no variety is added unless it has that trait," he says.

> *"The industry is fully aware of the risks during establishment, some which are beyond control, so the varieties of today must mitigate those factors as much as possible."*

Another hybrid candidate variety championed by Duncan is KWS Domingos, which he believes offers a solid solution for growers in the East/West region. "It's trait-loaded plus has a robust growth habit to maximise its yield potential.

"There's a pattern emerging here, but if it doesn't meet the standards, it simply doesn't make the grade for Openfield."

KWS product manager for OSR, oats, peas and rye, Rory Hannam, raises Domingos offers a high gross output of 109% of controls for the East/West. "It also has pod shatter resistance and TuYV resistance, both essential for a successful crop of OSR in the current climate.

"With growers looking to reduce or apply no insecticide to crops, having TuYV resistance is the best option to mitigate any risk of aphid infestation," he adds.

In terms of numbers, Domingos has a high oil content of 45.9%, and scores a 7 for light leaf spot and an 8 for phoma. It's also been screened by KWS for tolerance to verticillium.

Vigour wise, it's quick to get going, says Rory. "Domingos has very quick spring vigour allowing the variety to grow away from potential CSFB larval damage or any adverse conditions over the winter.

"Whereas KWS' internal trials across two years and nine locations throughout Europe have shown the variety yields well at lower nitrogen doses compared with an N-efficient control.

"It's a really exciting option to try out this autumn and one to watch out for. It ticks a lot of the boxes required of a modern, resilient OSR variety, providing the traits required for a successful, profitable OSR crop," he concludes.

Next generation resistance

Four years on from the official launch of RlmS, NPZ is bringing the next generation of stem canker resistance to the market. *CPM* finds out more.

By Charlotte Cunningham

In 2021, *CPM* reported on a pivotal moment in the battle against stem canker in oilseed rape with the introduction of the RlmS resistance gene by what was then known as LSPB, now NPZ. Fast forward to today and that story continues to evolve – this time with an even more promising development from the seed house in the form of Rlm12.

Since the RlmS trait entered the Recommended List, varieties carrying the gene have consistently outperformed older resistance types, with RlmS varieties like Maverick now achieving top scores of 9 for stem canker resistance.

By contrast, those relying solely on the widely-used Rlm7 gene are seeing scores decline to as low as 4 or 5. Experts believe this comes as no surprise, following reports of a breakdown in resistance during recent years.

Like RlmS, Rlm12 offers robust resistance against *Leptosphaeria maculans,* the pathogen behind phoma stem canker.

The origins of Rlm12 go back several years to NPZ's German breeding programme. Breeders had begun to notice a pattern of unexplained resistance in certain OSR lines – varieties that didn't carry known genes such as Rlm7 or RlmS, but were still showing strong performance against stem canker. This mystery triggered a deep dive into the genetic architecture of those plants.

"We started using state-of-the-art genomic and bioinformatic analysis to

Stopping stem damage

Rlm12 stops the disease from spreading through the petiole into the stem and that's where the real damage is done, explains NPZ's Michael Shuldham.

Elite breeding material

Unlike previous major resistance traits – which were introgressed from turnip rape and other exotic genetic resources through lengthy backcrossing and development cycles – Rlm12 was discovered from within NPZ's elite breeding material, explains NPZ's Dr Steffen Rietz.

Full faith in Karat

The first Rlm12-containing variety, Karat, has impressed the wider industry with Frontier recently adding it to its OSR de-risking partnership, explains Frontier's Kirsty Richards.

identify the source. That led us to a new genomic locus, which we've named Rlm12," explains Michael Shuldham.

Delving into this further, NPZ's Dr Steffen Rietz, who's led much of the genomic research behind Rlm12, explains that unlike previous major resistance traits such as Rlm7 or RlmS – which were introgressed from turnip rape and other exotic genetic resources through lengthy backcrossing and development cycles – Rlm12 was discovered from within NPZ's elite breeding material. This alone represents a paradigm shift in how resistance genes are sourced and brought to market.

"In 2021 we had two years of good stem canker pressure in our field nurseries," explains Steffen. "That gave us a chance to score our elite material for stem health and combine that phenotypic data with high-density genotyping using DNA chip technology. Using genome-wide association studies, we pinpointed a locus associated with strong stem health."

Interestingly, the locus had been described before in academic literature – in a 2016 paper by Harsh Raman – and designated as QTL (quantitative trait locus) Rlm12. But it hadn't seen significant use in commercial breeding programmes.

The rediscovery and validation of this QTL in elite breeding material allowed NPZ to accelerate the journey from identification to variety integration, achieving progress in just a few years – remarkably fast in crop breeding terms.

"This wasn't a one-hit wonder," adds Steffen. "It's part of a broader strategy at NPZ where we continuously scan elite material and genetic resources for novel resistances."

Crucially, like RlmS, Rlm12 is what NPZ terms an adult plant resistance. Earlier resistance genes such as Rlm3, Rlm5, and even the most widely deployed Rlm7 acted primarily in the cotyledon stage, targeting early leaf spot symptoms. While useful, these resistances were prone to breakdown over time, notes Michael.

PREVENTING DAMAGE

"Rlm12 and RlmS work differently – they stop the disease from spreading through the petiole into the stem and that's where the real damage is done. This is because stem canker leads to lodging, early senescence, reduced nutrient uptake, and ultimately poor yields."

By targeting this critical phase of disease progression, Rlm12 offers growers a more durable and yield-protective solution, especially when combined with other traits.

Securing this resistance into varieties has been the task of NPZ's Dr Christian Flachenecker who says the benefit of this stem resistance from a grower perspective, is a likely inherent yield advantage. "Stem resistance correlates more directly with yield. If you've managed to get the crop through the challenges of autumn and winter – especially in the UK, with issues like cabbage stem flea beetle – it's a tragedy to lose that crop at the final stage due to stem canker."

Moreover, stem resistance may also be more durable. While the precise

Yield benefits

Securing this resistance into varieties has been the task of NPZ's Dr Christian Flachenecker who says the benefit of this stem resistance from a grower perspective, is a likely inherent yield advantage

Rlm12: All you need to know

- **Rlm12 is a new adult plant resistance gene for oilseed rape targeting Leptosphaeria maculans**
- **It works like RlmS, stopping disease spread in the stem where yield losses are most severe**
- **Candidate Karat is the first UK variety to carry both RlmS and Rlm12, giving it a stem canker score of 8 and also benefits from TuYV resistance and a LLS score of 8**
- **Candidate trials have shown yields reached 109% of control, with top oil content among others in the category**

molecular mechanism of Rlm12 remains under investigation, early work suggests it might function differently from classical gene-for-gene resistance models like Rlm7. This could mean broader and more robust resistance, although as always in plant-pathogen interactions, no resistance is invincible, stresses Steffen. "Nature finds a way; we've already seen that with Rlm3 and Rlm7. Resistance erosion is inevitable over time, especially when a single gene is widely deployed."

As such, Rlm12 is being launched to complement other resistances like RlmS, rather than be a direct replacement, continues Michael. "It's a step forward again in reducing plant damage and slowing down pathogen adaptation, and by using it alongside RlmS and Rlm7, we're also protecting the longevity of those other genes as part of an integrated strategy."

Looking to the field and leading the commercial charge for Rlm12 is a new candidate variety from NPZ named Karat. It's the first to stack Rlm12 and RlmS – a double-barrelled approach to stem canker resistance, and one that's already showing promise in trials.

"It's all about giving growers a really healthy plant – one that's better able to withstand not just stem canker, but a whole range of pressures."

"For those wanting high output and strong agronomics, Karat is hard to ignore."

And arguably, the numbers back it up. In 2024 trials, Karat emerged as the second highest yielding candidate in the UK at 109% of control. This is of course on top a stem canker score of 8 and it also boasts a light leaf spot score of 8 making it the joint-highest scoring candidate for this increasingly important disease. Crucially, Karat is also resistant to TuYV and holds the joint-highest oil content of any candidate variety.

INDUSTRY BACKING

The wider industry has faith in Karat's integrity too, with Frontier recently adding it to its OSR de-risking partnership, explains Kirsty Richards, national seed technical manager at Frontier. "It's been a difficult few years for OSR, but for many of the growers who stuck with it this season, crops are looking the best they've been for some time," she says.

"We're not expecting the OSR area to bounce back overnight, but with improved genetics and risk management schemes for crop establishment, there's definitely renewed confidence."

That renewed confidence is something Frontier is keen to build on with Karat playing a central role in that strategy. As one of the five varieties included in its new OSR de-risking partnership, growers not only benefit from strong genetics but also a financial safety net – with OSR seed costs and even companion crop seed reimbursed under the scheme for any crops not established.

"Growers are telling us that they still see OSR as the best break crop available," comments Kirsty. "The challenge has been risk – and this partnership is all about reducing that risk while showcasing the very best in new varietal development."

With Rlm7 showing signs of fatigue in the face of growing pathogen pressure, stacking resistance genes together is fast becoming the industry standard so having this within Karat is likely to make it very appealing to growers, believes Kirsty.

"The environment is more volatile and that's accelerating the breakdown of single-gene resistances. Having Rlm12 stacked alongside RlmS offers much greater durability. It's not just about surviving today – it's about staying resilient tomorrow.

"We've seen it perform well in trials across two very different seasons. There's a level of consistency there and for us, it was a no-brainer to include it in the de-risking scheme. It has all the attributes we're looking for: high seed yield, good oil content, and real vigour from the outset."

While the variety currently lacks pod shatter resistance, Kirsty is quick to put this in context. "I don't see it as a deal-breaker. If growers are particularly focused on pod shatter, there are alternatives. But for those wanting high output and strong agronomics, Karat is hard to ignore."

While Karat may be the headline act for this season, there are more innovative varieties coming forward from NPZ with clubroot resistance Crusoe and HEAR variety Eriksen. Both of these varieties are set to bring forward new traits within clubroot and HEAR, further genetic diversity, and even more resilience to future disease pressure – an essential strategy in the ongoing war against pathogen adaptation, he says.

As growers look ahead to autumn drilling decisions, the combination of Rlm12, RlmS, TuYV resistance, and high oil content makes Karat a compelling prospect, he concludes. "This isn't just about plugging the gaps in the armour, it's about fundamentally improving the plant year-on-year while helping UK growers get the most out of every hectare." ●

Genetic discovery

The origins of Rlm12 go back several years to NPZ's German breeding programme.

Innovation Insight

Founded in 1897, NPZ is a leading breeder of oilseed rape, field beans and field peas with a long track record of breeding successful varieties for the UK grower. The company's philosophy is to keep the best of a traditional approach while investing in the latest technologies in plant breeding.

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

A niche for every interest

Plant breeding isn't a one-dimensional role; it's a multi-faced industry at the cutting edge of technology that's becoming ever-more important for agriculture's future. *CPM* explores the career possibilities.

By Melanie Jenkins

What image does a career in plant breeding elicit? If it's the white lab coats, safety goggles and petri dishes of the school science lab then this doesn't even go part of the way to encompassing the role of a breeder and the many and varied careers that tie into this industry.

Arguably, it could be said that plant breeding is having more of an impact on agriculture now than it ever has. Offering the potential means to significantly cut insecticide, fungicide and even herbicide use, it could also help to reduce nitrogen requirements, improve water utilisation and help plants to cope with the stresses caused by weather events or climate change.

As it increasingly embraces advancing technologies such as genomic selection and the use of drones, a whole raft of new roles could open up within the industry. "Agriculture and technology go hand-in-hand, as the industry strives under social, environmental and productivity requirements, and breeding can be an important player in this," says ADM's Chris Guest.

"There are exciting new technologies emerging meaning new skills will be required, such as greater IT literacy, more stats-based analysis,

Breeding solutions

Agriculture and technology go hand-in-hand, as the industry strives under social, environmental and productivity requirements, and breeding can be an important player in this, says ADM's Chris Guest.

increased drone operations and Normalized Difference Vegetation Index (NDVI) measurements, rather than individuals in fields with a ruler.

"And the industry will have to be alive to AI because it's a tool that could be harnessed and utilised in the plant breeding space and by commercial seed businesses," he adds.

SHIFTING SPHERE

Susan McCallum, plant breeder at the James Hutton Institute, agrees that technology is always evolving. "When I started in the industry, genotyping was the bottleneck but now it's phenotyping. Aspects such as robotics are changing the game, while gene editing is providing a whole new approach. Because of this, the industry is opening doors for new innovators with fresh ways of thinking."

According to Chris, there are numerous diverse careers related to plant breeding. Having worked for both a plant breeding firm and on the supply chain side of the fence, Chris has first-hand experience of how careers in the industry are tied to one another. "Purely within plant breeding there are two core areas: the technical or practical side, and the commercial side.

"On the technical side are the plant breeders themselves, but they require a team of people to make their jobs possible from those running and working on trials, to practical on-farm roles, a harvesting team, pathologists and even statisticians, working with official trial operators including AHDB and Niab as varieties move closer to commerciality.

"The commercial side could involve working on official national trials, roles with BSPB and AHDB, Niab, merchants or seed multipliers, marketing and even to the point of seed cleaning and treatment, or in sales. It's a huge sector and I believe it's often overlooked with both skills and resource gaps," he notes.

An aspect that Limagrain plant pathologist Rachel Goddard didn't realise immediately when starting her career in plant breeding was how many different roles there are within the sector. "When I first considered it as a potential career choice, I didn't necessarily want to be a plant breeder and wasn't sure how my skillset would fit within the industry.

"But if you're remotely interested in the sector then it's likely you'll find a role that suits your niche because it encompasses so many different opportunities."

Working at the James Hutton Institute,

Unconventional journey

The James Hutton Insitute's Rob Hancock had a far from conventional journey into plant breeding, having studied a degree in biochemistry and marine biology.

Rob Hancock feels that his position is halfway between academia and industry. "It's an area where you can define your own career path with a lot of capacity to follow your own interests – so long as you can source the funding.

"We're already seeing the expansion of controlled environment agriculture ▶

Advancing technologies
High-throughput phenotyping platforms can help to reduce the bottleneck around linking genetic variation to crop performance.

Attracting new entrants
Limagrain's Rachel Goddard believes the changing climate and threat to food production will raise awareness of plant breeding which could attract new entrants.

and in genomics, which are both fast-moving and increasingly significant areas. And plant breeding is an area where there are skills shortages; we struggle to recruit into academia, so there are career openings available.

"I believe that as food disruption rises up the political agenda and home-grown food becomes more important, we'll see increasing opportunities in this sector," he adds.

Although Chris came from a non-farming background, his passion for field sports took him to Cirencester to study rural land management. He then came across a role as a trader at what was then Gleadell Agriculture, where he went on to become seed manager in 2010. "It was during this period where building a network really set me up for my career," he comments.

Chris then took a role at LSPB, which is now NPZ UK. "I'd had a desire to go into plant breeding with the holistic vision of 'what are we working towards in three, seven or even 10 years' time?'. It's an area that's always excited me – using solutions to challenges such as growing populations.

"I believe plant breeding is about enriching human life in conjunction with supporting nature. We're helping to feed an increasing population on a decreasing area and therefore productivity gain – most of which comes through genetic discoveries from plant breeding – is a large part of that."

> ***"I wouldn't say it's been my academic qualifications which have helped me to succeed but the people around me."***

Chris recently returned to ADM as head of agri-inputs. "I'm excited to connect people at the plant breeding end of the industry to those at the point of consumption and the key stakeholders in the value chain. The role of merchanting is about bringing breeders and consumers together to create a vertically integrated business."

Rachel says she entered the plant breeding space through an undergraduate degree in plant and human genetics. "At first I didn't think too much about the plant side, but I found the modules and lectures really interesting so when I finished my degree and saw a PhD at the John Innes Centre in cereal pathology – specifically barley diseases – I applied for it. I hadn't really thought of plant breeding as a career until then."

The role was Rachel's first exposure to the industry and gave her a grounding in pathology techniques which she believes has been useful in her current role with Limagrain.

She then undertook a postdoctoral qualification with the John Innes Centre focused on wheat diseases. "This gave me further experience of field trials and built my confidence, and because it was an international collaboration, it exposed me to plant breeding abroad."

From there, Rachel started her current role as a plant pathologist with Limagrain in 2021. "There was a transition from research into industry, but I feel settled now," she says.

UNCONVENTIONAL BEGINNINGS

Whereas Rob's journey into plant breeding was far from conventional, having studied a degree in biochemistry and marine biology. "I had no idea what I wanted to do, so I undertook a year in immunology followed by a PhD in microbial chemistry before moving to the US to do a postdoctoral degree looking to understand how rhizobiales signal to roots to form a symbiosis."

Upon his return to the UK, he joined the James Hutton Institute as a biochemist investigating crop physiology. "I saw the value in taking the genetic approach to identify the genes that underpin various plant functions."

Although not a plant breeder, Rob works with geneticists to understand the function of genes and how specific genetic variance influences crop traits. "It's become clear to the whole community that through the genomics revolution, the genetics side of crop breeding is becoming faster and easier, and understanding genetic variance within a crop species is relatively cheap and straightforward.

"But what's still a bottleneck is linking that genetic variance to crop phenotype: performance, yield and quality," he explains. "For the past eight years I've been involved in raising funds to build the Advanced Plant Growth Centre at the James Hutton Institute, a key element of which is a high-throughput

phenotyping platform to reduce the hold up around linking genetic variation to crop performance."

Susan admits she left school with few qualifications and no clear career path, but has since forged a successful role in plant breeding. "I went into nursing after school but it wasn't for me, however, I did enjoy the science behind it. So I went to university to study for a biomedical degree and loved it – it was the first time I'd really stuck my teeth into science and the practical applications for it," she explains.

Assuming she'd work in hospital labs, she instead found a role as a technician on tree species at the Scottish Crop Research Institute, which led to a PhD in raspberries. "It was a different crop entirely and I'd never had a direct interest in it, but I ended up spending three years learning everything about the fruit, marker-assisted breeding and key traits."

From there, she took a job at the James Hutton Institute focusing on blueberries in 2009, undertaking work no one else at the organisation was doing at the time. "I really wanted to make my mark and spent the following 10 years producing cultivars and germplasm, as well as establishing a UK breeding programme for blueberries in 2017 when I became a breeder."

Susan loves that no two weeks are the same. "Plant breeding is seasonal and it brings art into science. There's also the element of looking at the economics of production because the margins are so small. I can see these differences in the cultivars and there's nothing more satisfying than sowing them and seeing them develop.

"Plant breeding requires every skill you didn't know you had," she adds. "You have to see potential where no one else would, you must be an engineer, a geneticist, a biologist, be aware of the environment, weather, insects and diseases. If you don't think it's the career for you, chances are there's a niche that you'd enjoy."

Like Susan, one of the most enjoyable aspects of Rachel's career is the variation, be that day-to-day, week-to-week or year-to-year. "Every season is different, there's always something changing and something new to learn, which keeps it interesting and satisfies the part of me that enjoys the research element.

"There's still a lot of fundamental science ▶

Build a network

Attending events such as Cereals can allow new entrants to meet breeders and build a network to help them forge their careers.

From nursing to breeding

Susan McCallum's career started out in nursing which led to a biomedical degree and eventually resulted in her becoming a blueberry breeder at the James Hutton Institute.

happening within industry, whether in-house, through collaborations, with PhD students or through public funding, so it's great to see the progress being made."

Working for Limagrain has also exposed Rachel to a whole panel of experts in their field within plant breeding. "Whether the team member is in R&D, genotyping or plant production, it all feels collaborative, with us all working together to bring varieties to market."

Chirs acknowledges the people he's worked with for helping to shape his career and believes growing a strong network of contacts is not only a highlight, but key to forging a career path. "There's lots to be learnt from engaging with your peers; I wouldn't say it's been my academic qualifications which have helped me succeed but the people around me."

And as Rob's career demonstrates, plant breeding is an international endeavour – pursuing paths within the sector can not only result in international collaboration, but also involvement with projects abroad.

"Being able to study in the US was a great opportunity but it's become more difficult to work and study abroad than it used to be. However, if you get the opportunity, it provides you with a different perspective and understanding. Doing this early in your career also demonstrates to employers that you're flexible and willing to push your career forward."

Another highlight for Rob has been making new scientific discoveries. "I've revisited work I did on potatoes 25 years ago where the project discovered how the plants initially switch how carbohydrates are unloaded into the tubers.

"Very recently we've published another paper detailing one of the proteins we believe is responsible for how these photoassimilates are unloaded. It's great having had a career length that sees your work come back around and advance."

ENGAGEMENT

Chris believes that hosting talks at universities about the seed sector is key to attracting new entrants. "We're our own best advocates but often there's a time and resource issue. Careers talks so often focus on agronomy or land agency but there are so many careers related to plant breeding."

This is something Rachel agrees with, noting not everyone is aware that plant breeding is an industry. "I didn't realise until further into my career path, but with the changing climate and threat to food production, I believe more people will become aware of the efforts within the industry, which could attract new entrants."

Rob feels that a lack of suitable university courses could be hindering new entrants. "A potential answer to this could be more involvement between universities and industry in designing courses, as well as lobbying government to encourage funding to these areas of study."

Chris also believes anyone who's passionate about the seed sector should attend events such as Cereals to help them to build a network. "It's a great opportunity to meet many of the seed breeders and speak to other industry leaders.

"The power of your network is so important, even on the supply side, where you might have to work with your biggest competitor to help you out," he says.

Rachel concurs, observing that building a network is helpful. "Everyone I've met in the industry has been great, so put yourself out there to attend conferences, events and demo days because people are happy to be approached and share their knowledge. Even those working for different companies or in different roles are all working towards the same end goal one way or another."

Rob's advice is to not specialise too early, instead taking a broader approach that avoids closing any doors. "As you progress, you'll achieve a better understanding of what really interests you and it's then that which you pursue. Keep in mind that there's a lot of flexibility in these types of careers and there are options to move sideways."

According to Susan, the best way to start establishing a breeding career is to grow plants. "You'll soon start to recognise what they require and whether they're short on inputs or don't like their environment."

She also stresses the benefits of asking questions: "A simple question can open up a new sphere of thinking, so be inquisitive."

New opportunities

As the plant breeding sector increasingly embraces advancing technologies such as genomic selection and the use of drones, a whole raft of new roles could open up within the industry.

Championing cover crop expertise

How to successfully grow cover crops is still a much-debated subject, however, AHDB is using its group of Champions to improve knowledge exchange. *CPM* finds out more...

By Mike Abram

From what initially felt like a missed opportunity to increase soil organic matter and capture nutrients, Wiltshire grower, Bob King, has integrated cover crops into a system that's improving soil health on his 250ha farm just north of the Salisbury plain.

Bob, one of eight AHDB Cover Crop Champions, says his interest in the technique started while power harrowing a field in a dry autumn. "I was sitting on the tractor trying to smash concrete golf ball-sized lumps of soil into something slightly smaller and not succeeding," he recalls.

"It's then you question, am I doing this right? If soils are that degraded and lacking in structure and organic matter, something is going to fail at some point."

That realisation set in train a series of changes implemented during the past 10-15 years – transforming a broadly conventional establishment system for oilseed rape, winter wheat, spring beans and winter wheat into direct drilling a much more diverse range of crops over a flexible 10-year rotation, including cover crops and two-year herbal leys.

According to Bob, three things are central to the new system: improving soil health, integrating livestock into the rotation, and increasing resilience against the challenges his conventional approach was facing.

"I was conscious that the conventional system was starting to show weaknesses," he says. "We were seeing resistant blackgrass persisting whereas yields had plateaued to around 9t/ha for winter wheat which I couldn't see increasing, while costs were."

Initially, cover crops were limited to mustard before forage maize to protect soils over winter, but after a few seasons and with growing concern regarding his farming system, Bob wanted to extend growing cover crops into the wider arable rotation.

"The biggest challenge was dealing with the trash from the cover crop before establishing a spring cereal or spring bean crop earlier in the season than you have to with maize."

After struggling, he says the turning point was buying a John Deere 750A ▶

Shift in perspective

AHDB Cover Crop Champion Bob King says his interest in the technique started while power harrowing a field in a dry autumn.

How is AHDB supporting cover crop knowledge exchange?

Four projects helping to address knowledge gaps associated with cover crops have been set up by the new farmer-led AHDB Cereals & Oilseeds research and knowledge exchange committee

In total, £60,000 has been committed to provide information about growing cover crops, including establishment and termination methods, nutrient management implications and proving long-term benefits.

The Cover Crop Champion project involves eight farmers growing a cover crop during the 2024/25 season, with various measurements and analyses undertaken to monitor progress and provide evidence and insight for future activities.

Each Champion has been sharing experiences via social media, YouTube and updates on the AHDB website.

Then, project two is a desk study to assess a decision support tool which estimates the quantity of nitrogen and nutrient release patterns from a wide range of cover crop species. "One of the biggest knowledge gaps for cover crops is around legacy effects of nutrient release," says Joanna McBurnie, AHDB environmental scientist.

Development of reliable information is complicated by the sheer range of cover crop species and mixes, agroclimatic conditions and management practices, but the project is aiming to build on decision support tools developed in other countries.

Another area where guidance is contested is around termination. As such, a third project led by researchers at Harper Adams University will review and appraise different approaches and impacts on establishment of following crops, weed population dynamics and biomass breakdown, with the aim of providing best practice management.

Finally, AHDB is also working in partnership with the creators of the Cover Crops Guide to keep it up-to-date and add practical case studies via the Cover Crop Champions.

Legacy effects
One of the biggest knowledge gaps for cover crops is around legacy effects of nutrient release, explains AHDB's Joanna McBurnie.

direct drill. "That provided the solution as it was able to drill into heavy residue and opened the door to growing broader mixes of cover crops."

UNEXPECTED BENEFITS

Direct drilling also unlocked another unexpected benefit which has played a role in shaping how cover crops are utilised on the farm – finding the soils were much better at carrying livestock. "When we were working soils to establish a cover crop in a min-till system, as soon as there was any wet weather on our clay loam over clay soils, you'd quickly find you'd struggle to run much stock.

''By not moving soil, we found we could run sheep on the cover crops and they wouldn't poach as much as if we had moved it," explains Bob.

That led to a partnership during the past four years with local sheep farmer, Tim White, taking on up to 300 Exlana ewe lambs to complement Bob's small flock of Wiltshire Horns to graze all overwintered cover crops, plus the herbal leys. "We quickly saw the benefits of grazing with quicker nutrient cycling," comments Bob.

Management is key with the sheep, he points out. "We graze quickly and not too hard early on to get some regrowth. I would sooner have two grazing periods than hitting it hard and only getting one."

The cover crops, now with multi-species mixes tailored for grazing, are established after winter cereals. "We find brassicas are key in the mix – I'm looking for as much cover as possible, plus winter hardiness, which brassicas bring. Including more stubble turnips makes the mix cheaper and the sheep do well on them."

He adds diversity to mixes with species such as crimson clover, vetch, phacelia and forage rape, alongside the turnips and tillage radishes, but recognises legumes won't fix much nitrogen overwinter. Equally, grass species are avoided after discovering they could quickly become a weed in following cereal crops, says Bob.

"With brassicas, clubroot can be

Livestock integration
A partnership with a local sheep farmer allows grazing of all overwintered cover crops plus herbal leys at Bob King's farm.

Watercourse protection

A key aim of cover cropping is mopping up nutrients to protect the river Lambourn, which runs through the heart of the Welford Estate, says AHDB Cover Crop Champion, Rob Waterston.

an issue but we've extended our rotation to grow less OSR, and rightly or wrongly, I think acidic soils favour clubroot. By improving soil health of our chalk-based soils we mitigate that risk – at least so far," he adds.

Establishment takes place as soon after harvest as possible using a mounted seed box to broadcast in front of a stubble rake. "It's a cheap system where we can cover 40ha in a morning before combining easily."

Moisture is key, and in most years when there's been rain in August, establishment has been good, explains Bob. Whereas last year, in his first year of being an AHDB Cover Crop Champion, a dry August contributed to a less successful outcome, he says.

"For the AHDB trial we established a cover crop in two fields, with and without a small degree of soil movement. The former provided a better result this year."

Even so, Bob doesn't envisage changing his establishment system unless absolutely necessary as moving soil reduces the grazing window – something he says he's keen to avoid.

The trial includes logging metrics such as results from soil mineral nitrogen tests in early autumn and in March, and peak biomass and nutrient analysis in December. Nitrogen use efficiency and yield impact on the following spring barley crop will also be monitored.

In Bob's system, the following crop is often a low input cereal within a Countryside Stewardship scheme – although that expires later this year. He believes that's allowed him potentially more flexibility with termination dates with yield a lower priority.

"We're limited on the herbicides we can use, so I want it to go in warm soils and come out of the ground quickly."

With cover cropping on the farm not directly part of either Countryside Stewardship or Sustainable Farming Incentive schemes, he relies on the low input cereal payment and agronomic benefits, as well as income from grazing to cover the costs of growing the covers.

However, growing a cover crop can potentially generate multiple income streams from carbon capture, SFI or similar schemes, and grazing, he notes. "If you then also see long term benefits to your soils, increasing soil organic matter and soil health that allows you to reduce inputs, you can start to realise financial benefits. That's something I'd like to see explored in the work with AHDB," he raises.

NUTRIENT DYNAMICS

Over in the South East, AHDB Cover Crop Champion Rob Waterston of the Welford Estate near Newbury says he's keen to better understand nutrient dynamics, particularly whether growing a cover crop can reduce nitrogen inputs on following crops.

"I can never quite understand what to practically do with data showing the quantity of nutrients captured by cover crops in fresh weight cuts," he explains. "If you look at the results, sometimes you could argue you don't have to put any nitrogen on your spring crop, yet you only have to experience a fertiliser miss to see the difference."

To investigate further, albeit a little crudely, he's undertaking a tramline trial with nitrogen rates of 70, 80, 90 and his farm standard 110kgN/ha in spring barley following an overwintered cover crop.

Each tramline will be cut and weighed over a weighbridge with grain samples sent for analysis. "I'm hoping to see some trends; I suspect we might have differences in grain nitrogen content and possibly yield," says Rob.

With a contract for malting spring barley looking for a spec of at least 1.6% grain N, but with penalties for being too high, achieving the correct combination of both grain N and yield is crucial, he notes.

But how did is journey to cover cropping begin? Rob says he first started growing them at the estate just under 10 years ago having added spring barley to the system to help manage blackgrass which was starting to get out of control in his previously winter crop-dominated rotation.

After initially starting with brassica-based cover crops, he moved away after finding they were increasing slug pressure, even in spring crops. He's also steered away from cereals in mixes because of competition effects with less aggressive species in cover crop mixes.

"We've settled on a mix of vetch, linseed, buckwheat, berseem clover and phacelia. We add a tiny bit of oil radish, although the jury is out because of slugs."

He says a key aim is mopping up nutrients to protect the river Lambourn, which runs through the heart of the estate. "It's a chalk stream so it's important to look after," stresses Rob. "I also wanted to get our soil's functioning and cycling nutrients better, so we could wean ourselves off some inorganic fertiliser."

According to Rob, soil biology is responding – especially in the farm's gravel soils – to the use of cover crops, alongside other soil health improving measures such as additions of organic amendments and reduced cultivations. Consequently, organic matter levels are increasing on around 95% of the farm's fields, he points out.

And, all of his cover crops are in an SFI scheme. "I'm sure the soil is better, so without that funding I would still grow them but we'd probably look at a much cheaper mix or even growing our own seed," 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 the Cover Crop Champions project, visit: ahdb.org.uk/cover-crop-champions

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Learning by doing with intercropping

With intercropping gaining traction among progressive growers, it's often those at the grassroots who lead the charge. *CPM* speaks to Ben Adams, who's been quietly trialling his own innovative mixes in Oxfordshire – fuelled by curiosity and practicality.

By Charlotte Cunningham

As growers continue to battle the twin pressures of tightening input costs and rising environmental expectations, many are looking beyond conventional practices to future-proof their farming businesses. Among these evolving approaches, intercropping is cropping up – quite literally – as a method that not only supports soil health but can also deliver tangible benefits to yield resilience and pest control.

Although far from a new concept, intercropping – growing two or more crops in the same field simultaneously – has become especially popular among regenerative and system-focused growers, but from peas and barley to linseed with oats, the combinations are as diverse as the motivations behind them.

Intercropping advocates say the benefits are multifaceted. Improved weed suppression, better nutrient use efficiency, enhanced biodiversity, and yield stability top the list. But does it stack up in commercial practice?

For Oxfordshire farmer Ben Adams, intercropping isn't a buzzword – it's an evolving, farm-first approach that balances regenerative ambitions with hard-nosed economics.

TRIAL AND ERROR

While intercropping has been in place for a number of years on the 380ha arable farm near Bicester, the journey to get there has been made up of trial and error and frequently refining his intercropping system, driven as much by interest as by strategy. "I've always liked to try things for myself," says Ben. "I don't really trust anyone else until I've seen how something works on my own land."

His foray into intercropping started not with a formal trial, but with a simple observation. "I began using oats as a companion crop with linseed, mainly to help with flax flea beetle control," he recalls. "That led me to peas and oats. In fact, I grew peas and oats together before I ever grew oats on their own."

From those early experiments,

Beyond a buzzword
For Oxfordshire farmer Ben Adams, intercropping isn't a buzzword – it's an evolving, farm-first approach that balances regenerative ambitions with hard-nosed economics.

A winning combination?
One of Ben's first experiments with intercropping was growing peas and oats together. In fact, he grew peas and oats together before he'd ever grown oats on their own.

Ben's curiosity deepened. In 2022, he successfully applied to the School of Sustainable Food and Farming's Net Zero competition, which funded a more structured set of intercropping trials in spring 2023.

"I ran nine different intercropping plots across 16.5ha," he explains. "They were all zero-input and direct-drilled – essentially, we just left them to it until harvest to see what actually worked."

The trials featured a mix of cereals (oats and barley), legumes (peas, beans, and vetch) and brassicas (mustard and spring oilseed rape). "Every trial included a legume, and some included two- or three-way mixes with cereals and brassicas. They were laid out as 24m and 48m tramline trials."

Following harvest, the trial plots were all put into winter wheat, providing further insight into soil and system performance post-intercrop. "It's not just about how the mixes perform in their own right, it's also about the impact they have on the next crop."

So what's he learned? For Ben, it comes down to compatibility and system fit. "The best performer was peas and mustard. We use mustard a lot for cover crops and winter bird food mixes, so growing it ourselves makes sense – and it matured well with the peas. It just worked."

He's also had success with oats and beans. "They're both tall crops, so compete well with weeds and are both natural breaks for take-all in wheat. Their maturity timings also align nicely."

However, not every idea paid off. "Spring oilseed rape was a complete pain," admits Ben. "Everyone said it wouldn't work but I had to try it for myself; I won't be doing that again," he laughs.

Ben's trials have always been led by what he describes as 'gut feel and logic', but he hopes that by recently joining the Nitrogen Efficient Plants for Climate Smart Arable Cropping Systems (NCS) project, he'll be able to add in an extra layer of scientific rigour.

"I chatted to Skye [Melita] from BOFIN at the Oxford Farming Conference who pointed out that I was already doing most of the work required to be a Pulse Pioneer. By undertaking some additional sampling, I would be eligible to join the project and get paid for my involvement."

RESEARCH PROJECT

Launched in 2023, NCS is a four-year £5.9M research programme involving 200 UK farms and 17 partners, led by the PGRO. The project aims to bring about a reduction of 3.4Mt CO_2e per annum, or 54% of the maximum potential for UK agriculture, through increasing pulse and legume cropping in arable rotations to 20% across the UK, thus replacing 50% of imported soya meal used in livestock feed rations with home-grown pulses and legumes.

As the project concludes its second year, research partners are bringing a sharper focus on practical insights into pulse-inclusive rotations and their real-world impact on nitrogen use, emissions and yields.

At Cranfield University, spring beans and oats have made way for wheat in glasshouse rotations, as researchers continue their deep dive into soil mineral nitrogen (SMN), greenhouse gas emissions and root development. Using cutting-edge gantry-based sensors, scientists aim to detect differences in wheat performance based on preceding crops – legume versus non-legume – and varying moisture regimes. Metrics such as nitrogen harvest index and yield will form key outputs from this controlled setting.

Meanwhile, ADAS has turned to the field – and the data. By dissecting historic YEN records and public sources, researchers are mapping the UK's most common cropping sequences.

Their goal? To understand how increasing the pulse share might reshape nitrogen management and farm outcomes nationally. Pulse Pioneer trial data and SMN testing are also being combined to refine N recommendations for rotations that include legumes.

While at the James Hutton Institute, the Centre for Sustainable Cropping enters its 16th year, now equipped with 'nitrogen-blades' from PBL Technology to monitor real-time soil nitrogen losses. Early findings from life cycle assessments show that spring faba beans significantly reduce environmental impacts and boost barley and wheat yields – by 1.2t/ha and 0.9t/ha, respectively.

The team is also developing ▶

Scientific rigour
Ben has recently joined the Nitrogen Efficient Plants for Climate Smart Arable Cropping Systems (NCS) project in the hope he'll be able to add in an extra layer of scientific rigour to his trials.

- 'CropGOBLIN', a scenario tool to assess the benefits of scaling up pulse production to 20% of the national rotation.

Although Ben only joined NCS formally this spring, it hasn't changed his process dramatically so far. "I've just adapted what I was doing anyway. The trials are the same in essence, but we're capturing more information now and that's what helps to make more sense of everything."

While Ben is building up a bank of his own experience, he acknowledges the lack of joined-up guidance on intercropping is a barrier for others, something he hopes will be enhanced by being part of the project.

"There's plenty of research going on but it's all fragmented. It should be brought together as it's hard for farmers to find clear, practical advice. That's what being a part of the project should do."

CONTINUAL IMPROVEMENT

This spring, Ben is continuing to tweak his intercropping approaches. "We're trialling canary seed and beans together now, partly because we want more of our own supply for supplementary bird feed. It all loops back to how we farm and what we require."

For those considering dipping a toe into intercropping, Ben's advice is straightforward: start with what fits your system. "We were already growing peas, and oats are a good break crop—so that combination made sense. Mustard was being used in other parts of the farm, so I just pulled it in. It doesn't have to be complicated."

He stresses that system fit matters more than theory. "If I had livestock I'd just wholecrop peas and oats together – really simple. But I'm a combinable farmer doing a lot of stewardship work, so I'm looking at crops like vetch and canary seed because that helps me meet my wider goals."

For Ben, the motivation to experiment remains rooted in curiosity. "I just like finding things out for myself. Sometimes it works, sometimes it doesn't, but the only way to know for sure is to try." ●

Pulse power paves the way to nitrogen cuts

Fresh trials from Agrii under the NCS banner point to a 25% reduction in nitrogen fertiliser use after winter beans – without compromising yield

A fresh round of nitrogen trials is helping to sharpen strategies for wheat growers looking to trim fertiliser inputs without sacrificing output – and pulses are at the heart of it.

Field trials led by Agrii as part of the NCS project are highlighting the potential for a 25% cut in nitrogen fertiliser rates in winter wheat crops following winter beans. Crucially, the results suggest little to no yield penalty when nitrogen is reduced from RB209-recommended rates.

"We've long known about the benefits of pulses in the rotation, but we're now starting to quantify just how much nitrogen they can leave behind," explains Lucy Cottingham, trials and agronomy specialist at Agrii.

During the 2023/24 season, Agrii ran small-plot nitrogen trials at Cornish Hall End in Essex and Sharnbrook in Bedfordshire. Both sites – characterised by medium to heavy soils – provided a strong foundation to explore different nitrogen rates and split application timings.

Starting from the RB209 benchmark of 190kgN/ha for wheat following beans, Agrii compared rates of 125% (238kgN/ha), 75% (142kgN/ha), and 50% (96kgN/ha). Two- and three-split nitrogen regimes were also tested, with the latter including an early application around growth stage 25.

"The idea was to see how low we could go without losing performance," says Lucy. "Soil mineral nitrogen tests taken in autumn and again in February helped us to understand what was already available, especially at depth."

At the Essex site, plots receiving 142kgN/ha yielded 9.42t/ha – almost indistinguishable from the 9.48t/ha recorded from the 190kgN/ha treatment. This 25% cut equated to a notable reduction in carbon emissions, dropping from 646kg CO_2e/ha to 482.8kg CO_2e/ha.

The three-split nitrogen regime also consistently outperformed the two-split approach, delivering an extra 0.3t/ha in yield. "That early nitrogen dose may have helped build biomass at a critical stage, particularly given the wet winter which likely washed out some residual N," adds Lucy.

Tools like PlentySense nitrate sensors and drone imagery were also used to track crop nitrogen dynamics throughout the season. While full conclusions are still pending, Lucy believes such technologies could become valuable aids in tailoring applications more precisely.

Not only did the reduced nitrogen rate deliver comparable yields, but it also generated stronger gross margins, she says. "We found that the 142kgN/ha with a three-split strategy offered the best return on investment across both sites."

The Bedfordshire trials followed a similar pattern. Here, 142kgN/ha produced 7.88t/ha compared with 7.95t/ha with the full RB209 rate. Crucially, a number of plots still reached the 13% protein threshold required for milling premiums – further supporting the case for reduced inputs.

With ear counts largely consistent across treatments, it was grain protein and nitrogen levels that responded most strongly to increased fertiliser – although this came at a higher environmental cost, notes Lucy.

She says the message is clear: "There's a compelling argument for reducing nitrogen by 25% in wheat following beans, particularly on heavier soils. The yield is there, the margins are better, and the environmental benefit is significant."

As more data rolls in from the wider NCS project, growers may soon find they have the tools – and the trial evidence – to back bold nitrogen decisions in pulse-rich rotations...

Slashing nitrogen rates with beans

Field trials led by Agrii as part of the NCS project are highlighting the potential for a 25% cut in nitrogen fertiliser rates in winter wheat crops following winter beans, explains Agrii's Lucy Cottingham.

Advancing intelligent farming

There's endless talk about AI in the media at the moment but arguably a limited amount of discussion regarding what the technology could do for farming. *CPM* explores its potential for the industry.

By Melanie Jenkins

From intuitive soil mapping to intelligent weeding, or even highly advanced plant breeding techniques, AI is expanding into agriculture at speed.

According to the World Economic Forum, AI in agriculture is projected to grow from $1.7Bn (£1.3Bn) in 2023 to $4.7Bn (£3.5Bn) by 2028. Firms aren't only seeking to solve the problems faced by the industry, but are taking innovative new approaches to advance it to the next level.

For one, AI 4 Soil Health is utilising AI to create layered soil maps which could revolutionise how soil is managed, with the organisation claiming it could be used to model solutions for the future impacts of climate change.

"The Soil Health Data Cube Map will help policy makers, farmers and land managers better manage our soils for biodiversity, carbon storage and productive farmland," says AI 4 Soil Health and OpenGeoHub's Tomislav Hengl.

"Using AI tools and open-source data we've created a prototype digital-earth-twin – a map of European soil health which will enable users to analyse and test soil management practices to deliver better outcomes and environmental benefits and to predict the impact of different climate change scenarios.

"This is probably the most sophisticated soil health modelling framework to date. It'll be an indispensable tool for those involved in regenerative agriculture, carbon farming, and those looking to change farming land use systems – such as realising soil carbon sequestration potential, shifting to agroforestry and similar.

"We'll be able to provide the modelling capability to empower them with real world evidence while significantly reducing the cost, time and labour involved in traditional soil monitoring practices," he explains.

Around 100 scientists have contributed to the project, which integrates hundreds of thousands of observations and data points on soil, climate and vegetation using a multidimensional matrix powered by artificial intelligence and high-performance computing.

This new tool allows scientists and researchers to obtain open data representing European landscape and soil properties in space and time, and can potentially be used to simulate complex scenarios and accurately predict, test and model real world solutions.

The Soil Health Data Cube Map enables users to monitor key soil health factors including pH levels, soil carbon, and biological parameters over time with weather and climate data. Its spatial resolution is down to 20m or 30m with the addition of vegetation cover and most recently more than 20M European crop field boundaries.

Farmers will be able to access and view an accurate picture of their farms, exploring historical and future patterns of soil health based on different climatic and land use scenarios.

A new view

AI 4 Soil Health is utilising AI to create layered soil maps which could revolutionise how soil is managed.

Out with the weeds

Mechanical weeding is being taken to new levels with AI able to identify weeds with precision.

Although this is the first version, the team plans to develop the data cube further during the next three years by populating it with significant volumes of additional data together with new remote sensing information. This should advance its ability to predict and model future scenarios to new levels of detail and accuracy.

AI 4 Soil Health is working with more than 20 partner organisations to develop practical experiments on the ground to showcase regenerative practices to ensure good measurement tools are at the heart of soil recovery.

According to AI 4 Soil Health's Mogens Humlekrog Greve, this innovation provides a useful way of identifying regions where soil health is at risk, highlighting areas that require urgent restoration. "This holistic approach enables continuous monitoring and detailed insights into soil health across Europe, promoting better soil management practices. We're proud that the data is open and available to a diverse range of users so everyone can benefit."

A Soil Health smartphone app should be available in 2026 which will make this data available to all and allow farmers to benefit from this complex analysis on their mobile phones.

Another company harnessing the power of AI, but for an altogether different purpose, is AgriPass, which has created its Adaptive Selective Tillage (AST) tool. This utilises AI and real-time sensing to perform individual plant-level analysis, identify and characterise weeds and crops, and perform a highly localised rapid tilling action.

Using dynamic 3D terrain modelling to support data driven actions, its machine learning system enables fast and precise weeding using a towed machine. The firm claims it can determine how to address each weed according to its characteristics, and through using dozens of specialised actuators, can hoe at a speed of hundreds of weeds per second.

The Israeli firm is attending this year's Groundswell festival on 2-3 July to showcase its technology.

Other firms are also utilising AI to improve cultivation and mechanical weeding. The Stout Smart Cultivator is a software-defined, tractor-drawn implement that uses machine vision and artificial intelligence to cultivate and weed fields using mechanical blades.

According to Stout, each Smart Cultivator clears 0.4-0.8ha per hour depending on soil conditions, using mechanical blades controlled by its proprietary AI model that recognises each weed and each plant individually with 99.99% accuracy.

While AI and solutions such as these might seem new, firm's such as Computomics have been working with the technology in the plant breeding space for more than a decade, notes the firm's Sebastian Schultheiss. "Using AI for text and images is one thing, but implementing it in plant breeding is on an entirely different level.

"With pre-trained models which understand crop growth and genetic datasets, our AI solutions are designed to seamlessly integrate with the germplasm pool that breeders have," says Sebastian. "We've built AI models with new mathematical approaches for plant breeding that are tailored to phenotyping measurements, genetic information and gene-environment interactions."

One of the biggest challenges to adopting AI in plant breeding is how to select field-ready genetic material while faced with climate uncertainty, he observes. "What effective, conventional breeding does best is predict how genetics behave in past conditions."

However, Computonics' system is designed to emulate future climatic conditions and project

plant performance in novel or untapped locations, while identifying the best performers with specific genetic combinations, he explains.

"We allow breeders to make better decisions with data — both faster and from a larger pool, reducing trial-and-error and resulting in the development of crops that'll actually thrive in a given set of environmental conditions."

The AI technology aims to give plant breeders a leg up on unlocking new information concerning genotype-environment interactions, providing a more efficient means by which to produce climate-resilient high-yielding varieties.

"This level of precision is crucial as breeders face growing pressure to develop crops that thrive in environments, withstand extreme weather, and adapt to shifting rainfall patterns and soil conditions," he adds.

"During the past decade, we've made significant strides in our journey with AI. Early plant breeding relied heavily on statistics often overlooking or actively ignoring environmental factors. The breakthrough came when we integrated climate data, and thus genotype-environment interactions, into AI models — suddenly, we could predict how different varieties would perform across specific environmental conditions."

This opens new possibilities for breeders, allowing them to expand into previously untapped regions and maximise the potential of their germplasm pools, he believes.

"As AI continues to reshape agriculture, we want to ensure plant breeders have the right tools, technology, and knowledge to unlock its full potential. That's why we're taking the next step: harnessing the power of AI foundation models to boost plant breeding," says Sebastian.

A common goal

Taking a collaborative approach to AI, Burleigh Dodds Science Publishing is utilising the technology to provide research to academics that could help agriculture meets it net zero goals.

AI foundation models are advanced AI trained on large amounts of data, allowing them to be fine-tuned for specific agricultural challenges. For example, to capture intricate patterns in genetic sequences, predict plant trait performance, or to identify genetic markers linked to diseases, he explains.

"Every breeding company has their own specific germplasm pool that our models are attuned to; this is why it's natural to us to respect our clients' data ownership. Everyone's data is only ever used for their own benefit," adds Sebastian.

Harnessing AI is helping firms such as GeneNeer take plant breeding to the next level. Co-founded by Dr Kinneret Shefer, its technology offers the possibility of unlocking traits in crops in new ways. Its Mirtron AI tool allows for tissue and time-specific gene editing that can silence or express specific traits in a plant, explains Kinneret.

Mirtrons are very small silencing element precursors originating from spliced introns, rather than being transcribed from independent genes, while introns are non-coding sections of a gene.

"There are some traits you may only want expressed during flowering or controlled to a set magnitude – this is what we call the next generation of gene editing; it's more precise," she says. "It also means we can make sure no other parameters are being disrupted, such as yield."

AI comes into play because the firm requires computer tools to select the correct genes to be expressed. "We use AI to choose the right introns that won't introduce a new sequence because gene editing is based on not introducing new sequences to the genome. AI allows us to select the gene that'll only be expressed where we want it."

The technology also allows the firm to translate knowledge it has on one crop to another. "Using AI to look at the genes, we can predict which might behave in a certain way in another crop," she adds.

In Bayer's global plant breeding business, AI in the form of predictive analytics and machine learning is being used to select new breeding crosses and predict breeding outcomes on a scale and at a speed that's never been possible before.

"As we were scaling our breeding and field research efforts and starting to collect more dimensions of data, it became virtually impossible for a human being to sift through the data to make informed decisions," says Bayer's Phani Chavali.

Advanced gene editing

AI tools make it possible for tissue and time-specific gene editing that can silence or express specific traits in a plant.

In response to this challenge, the firm built an AI assistant which helps breeders select the right candidates in a breeding programme. It relies on cloud-based algorithms built on a foundation of roughly 1.7Tn calculations, enabling a significant shift in the scale and speed of the breeding pipeline.

Then, taking a collaborative approach to AI is Burleigh Dodds Science Publishing, which is utilising the technology to provide research to academics that could help agriculture to meet its net zero goals.

The academic publisher specialises in issuing edited collections summarising key trends in agricultural science research. Its latest addition is AgNetZero, a new intelligent knowledge Software as a Service (SaaS) solution which is powered by the firm's content, says the firm's Rob Burleigh.

Developed alongside UK-based technology partner Librios, AgNetZero equips users with the ability to search across more than 2300 research documents created by internationally renowned authorities in agriculture and food science working in academia and industry, he explains.

Additional features allow subscribers to upload their own documents to sit alongside the Burleigh Dodds' content. "They can also perform AI-powered analysis to create an array of editable and exportable documents, spanning from research summaries, to presentations, training guides and a range of marketing and communication outputs," says Rob.

"AgNetZero has added a different dimension to the content we produce," he explains. "It's brought the research we publish to life and taken it off the page and screen, allowing users to truly engage with that same research in a way that hasn't been possible before." ●

Fostering data-driven robust rotations

"It's a means of identifying technology use cases, screening potential issues and de-risking data-driven decisions on farm."

JONATHAN TROTTER

By utilising a network of forward-thinking farms to identify where technology is best positioned to benefit agronomic strategies, Agrii is striving to quantify what value new innovation can offer the agricultural systems of today. *CPM* explores the company's Digital Technology Farms initiative.

By Janine Adamson

As the saying goes: with knowledge, comes power. Because through improved understanding, the opportunity to take control and influence the outcome of a situation has a greater chance of being realised.

For agriculture – an industry highly influenced by unpredictable externalities – being able to regain a level of control is arguably very desirable, even more so when success is now quantified by more than just yield.

Whether the goal is to improve margins, reduce the carbon footprint of a crop, or encourage on-farm biodiversity levels, the use of agronomic inputs is increasingly under scrutiny in a bid to secure a sustainable farming future.

For Agrii, a key component in addressing all of these challenges is harnessing the power of real-time data to not only provide economic and time-saving efficiencies, and therefore optimise input use, but to boost the knowledge of both

R&D screening process

Agrii's Innovations Technology Group focusses on evaluating, filtering and implementing new data-driven innovations to help identify what's relevant, says the firm's Jonathan Trotter.

Challenging convention
For Agrii's Lucy Cottingham, a core principle of both the ITG and DTF is to challenge agronomic convention.

farmers and agronomists.

This led to the company forming its Innovations Technology Group (ITG), explains technology trials manager, Jonathan Trotter. "The ITG is focussed on evaluating, filtering and implementing new data-driven innovations to help identify what's relevant to our teams and their farming customers," he says.

"The group consists of a range of individuals across Agrii – from R&D colleagues to crop specialists and agronomists – and has so far evaluated around 75 technologies including drones, sensors and software for a variety of crops."

DIGITAL TECHNOLOGY FARMS

As a means of facilitating the work of the ITG, Agrii launched its Digital Technology Farms (DTF) project in autumn 2023. The project involves a network of commercial farms to develop, trial and demonstrate technologies at a practical scale to determine their benefits in comparison with farm-standard practices.

The DTF currently consists of four sites across the country: the flagship Revesby Estate in Lincolnshire, Throws Farm in Essex, (Agrii's R&D Hub), Brotherton Farms in Johnshaven, Scotland, and Flightshot Farms in Horsmonden, Kent. "By creating a targeted and considered approach to selecting new technologies, we can help to increase their adoption rate and thereby unlock the benefits of the resulting data," says Jonathan.

"It's a means of identifying technology use cases, screening any potential issues and therefore de-risking data-driven decisions on farm."

For Agrii's UK digital agronomy development manager, Lucy Cottingham, a core principle of both the ITG and DTF is to challenge agronomic convention. "For example, farmers and agronomists have long used wheat growth stages as a basis for crop fungicide applications. However, with enhanced monitoring and greater insight, it could be possible to refine this further for year-round data-based decision making," she says.

"Equally for the agronomist, having that real-time data could be a way to evidence recommendations and justify spray applications in an ever-evolving regulatory climate."

Last year at Agrii's Revesby Estate DTF, the ITG used a range of new technologies to explore fungicide application timings, nitrogen rates and timings, NUE, as well as conducting a cost benefit analysis. This involved managing a winter wheat field throughout the growing season based on the various technology and data sources (known as field of tomorrow), compared with a traditional agronomic strategy (field of today).

As part of the disease control aspect of the work, a sophisticated weather station sensor and associated smartphone app were used for the field of tomorrow to monitor the crop and determine the in-season disease risk with a view to finessing fungicide recommendations.

This was used in conjunction with knowledge about the specific variety (RGT Highgrove) including its disease scores, plus information about fungicide product efficacy, explains Lucy. In comparison, the field of today involved conventional timings and chemistry according to standard farm strategy.

In terms of nitrogen, a Skippy Scout-powered drone was used in combination with Agrii's digital platform, Contour. "We used the Contour NDVI satellite imagery and Skippy Scout GAI measurements alongside one another to formulate a variable rate application plan for each timing," continues Lucy.

"Available nitrates were then tracked throughout the soil profile using PlentySense nitrate sensors to provide readings at three soil depths: 10, 20 and 40cm. The sensors work by quantifying the available nitrates in soil moisture and indicating where within the soil profile they are and at what concentration.

"This can then be used to understand whether excess nitrates have been applied or to visualise release patterns throughout the season."

Having analysed the data populated from the field of the future, Lucy says the results were in fact mixed. "The greatest benefit has been shown to be in nitrogen applications – using the data insights meant we could reduce rates on the lighter areas of the field.

"Equally, the NUE results proved to be the same for both the DTF-led approach and the farm standard (48% average). This means that while we spent less on nitrogen for the field of the future, we still achieved the same NUE yet it was more sustainable," she explains.

HARD TO IGNORE

Offering a compelling story, the trial results have since led the estate's farm manager, Peter Cartwright, to change his approach to nutrition for the farm's entire wheat area. "You can't ignore the cost benefits of variable-rate N that the DTF work has shown, so we're now going to use Skippy Scout drone AI software, Contour and variable rate nutrition across the estate," says Peter.

"We've learned a lot from being part of the DTF network already and are sure this will continue in the future. It's exciting to be part of such an important and forward-thinking project."

However in contrast, finessing the ▶

Applied findings
Following involvement with the DTF project, the Revesby Estate is now committed to using Skippy Scout drone AI software, Contour and variable rate nutrition across its farming area. Pictured: Peter Cartwright (L) and Jonathan Trotter (R).

De-risking

With many solutions coming to the market from start-ups – which aren't necessarily fully developed – Agrii aims to de-risk the screening process for growers, explains RHIZA's Sam Fordham.

farm's fungicide strategy remains a work in progress, admits Lucy. "In ways the trial went against the curve meaning at the moment, we can't wholly rely on technology in isolation; disease management still requires an agronomist's input.

"But, this further supports the concept of an agronomist becoming an interpreter of data, and that they very much continue to have an integral role in crop management," she highlights.

Lucy believes the approach to fungicides was a significant factor towards a whole field yield difference of 1.1t/ha - in the favour of the field of today. These results were driven partly through a greening effect and other physiological benefits attributed directly to the use of traditional chemistry in the programme, but also as a direct result of technology not providing an accurate enough picture of what was truly taking place in the field, she says.

"While disease visually was low in field what was happening within the plant was something we couldn't see and that's where traditional fungicides outperformed our technology driven approach."

According to Jonathan, the ITG strives to work with innovations which are at a certain technology readiness level and that can be adopted short-term, rather than being at a proof of concept stage. He says the team then works alongside the solution's developer to improve and tweak the technology to ensure it's fit for purpose.

"This is how we add value and boost adoption rate," he comments. "A good example is Skippy Scout – we currently have more than 20 agronomists regularly using the drone as part of their advisory service and we hope to develop this further by integrating it formally with the Contour platform."

As for further down the line, the ITG hopes to bring PlentySense to growers within the next year, following at least two years of ground-truthing through the DTF project, adds Jonathan.

INFORMATION OVERLOAD

Even so, understanding new technology, tools or data, can be overwhelming, believes RHIZA's head of technical, Sam Fordham. "And with so many solutions coming to the market from start-ups – which aren't necessarily fully developed – Agrii aims to de-risk the screening process for growers," he says.

"Equally, technologies may come from academics or other sectors beyond agriculture. Without critical, practical farming knowledge behind them, there's a chance use cases may be missed, or the innovation is simply not farm relevant in the first place.

> ***"Having real-time data could be a way to evidence recommendations and justify spray applications in an ever-evolving regulatory climate."***

"So our work at the Revesby Estate demonstrates how collaborating with a commercial farming business has the potential to unlock these new technologies and improve understanding."

Working in parallel with the ITG and DTF project is RHIZA – Agrii's digital agronomy department. Part of the RHIZA remit is to continue developing the Contour web platform, highlights Sam.

"Contour is our vehicle to serve data to customers in a relevant way; enabling meaningful actions on-farm through putting data, decision support and planning tools into the hands of growers. Having taken off during recent years, Contour now covers around 1M hectares of land across the UK, of which 350,000ha is under variable rate planning, but there's still much more we can achieve with it."

According to Sam, with a goal of continuous development, Contour is evolving beyond just VR Planning. "The platform has the capacity to devise nutrient management plans, IPM plans, plus facilitate wider land management tasks.

"And, excitingly, Contour's next steps are to integrate with TELUS Agriculture's new farm management software platform, TELUS Crop Management (TCM), which will be available early 2026. This integration means the new technologies screened through DTF, such as Skippy Scout and PlentySense, will then feed into Contour.

"Agronomists and growers will be able to access real insights to help make better decisions when creating plans or recommendations."

Sam says seamless sharing of plans and data from Contour to TCM will allow for easy job management and should reduce the chances of having to enter data more than once. "We want to avoid data silos while also preventing growers from having to use an overly complex digital platform.

"If we can achieve this and therefore support growers to optimise their input use, the financial and environmental benefits will span far beyond just having a better crop," he concludes.

Climate resilient cropping

With weather extremes becoming more frequent, and challenging conditions now perceived as the norm, what can growers do to improve the resilience of their cropping approaches?

This series of articles, kindly sponsored by Agrii, aims to explore some of the different approaches to de-risking crop production – from making better use of nutrients and boosting NUE, to getting the most from plant genetics.

***CPM* would like to thank Agrii for providing expert insight into these topics, and for the privileged access to the individuals involved.**

Driving operations

Utilising data from a Fendt tractor fleet is helping an arable and root crop grower to improve operational efficiencies. *CPM* discovers how using the FendtOne onboard and offboard software is challenging convention.

By Melanie Jenkins

Nottinghamshire-based Robert Thomas Farms has embraced the technology of FendtOne onboard and offboard systems to streamline operations, optimise tractor use and increase customer communications.

Operating four gen 6 Fendt 700 Vario tractors which all run on the FendtOne onboard system, the farm also uses FendtOne offboard – an office-based software package that's fed data from the fleet and can create tasks to control operating costs.

Tractor operator Adam Henton manages the tasks sent to the fleet and is increasingly using data available through the technology.

"Using FendtOne offboard I've been able to create and log tasks for each tractor in the fleet. The data collected during that task is fed back to me and I can produce reports and evaluate the efficiency of the tractor's hours against the task," he explains.

The 650ha farming enterprise includes cereals, carrots and sugar beet, plus land in stewardship, horse paddocks, a herd of outdoor reared pigs and 20ha of potatoes.

"The carrot crop makes up the bulk of our turnover and requires the most hours to cultivate and manage. We don't operate controlled traffic, but we've used FendtOne to improve our field mapping, boundaries and A-B lines," he adds.

Adam says it's the accuracy of this data that's impressed the farm, which has used other systems in the past with varying degrees of success. "By remapping fields with FendtOne and exporting the data to the offboard system, we've been able to accurately record tractor and operator performance across different crops. In future years we can use this data as a benchmark and improve how we operate and reduce our costs."

The farm contract hires its fleet from Pyketts Tractors and in doing so, has a fixed cost to use as the basis for its calculations of tractor efficiency. "Every hour affects our bottom line and using FendtOne we're able to see how idling hours, fuel economy and operating time are all having an effect on margin.

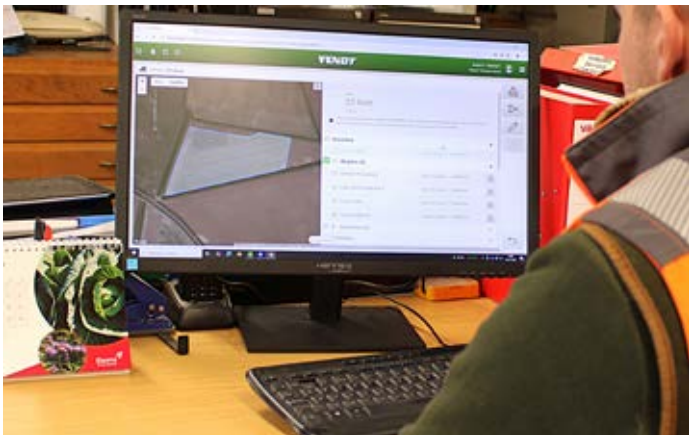
"The aim is to only have tractors working for the time that we require them in the field, and to choose cultivation methods that minimise ▶

Accurate costings

When costing a job for another farm, tractor operator Adam Henton can use data from previous tasks to provide accurate quotes.

Straw savings

Tractor data allows for the removal of headlands and other areas that aren't cropped which has reduced the amount of straw being bought in and provided a saving.



Evaluating efficiency

Cultivation techniques are compared by creating tasks and sending them to the tractors which feedback the time and fuel use.

hours to make best use of all the farm's machinery," he comments.

Adam has started to compare cultivation techniques by creating tasks and sending them to his tractors which feedback the time and fuel use and enable him to calculate which is more efficient. "I can analyse how a field that's ploughed and pressed compares with the use of a subsoiler.

"There's a case for both depending on soil type and the crop we're planting, but instead of repeating methods because it's what we've always done, we're now making decisions based on crop yield and cultivation cost," explains Adam.

A key task for the FendtOne data has been to identify operational efficiencies for crops, he highlights. To do this, the farm has been using task information to choose cultivation techniques based on the soil type and crop variety.

"The data from the tractors won't change the necessity to carry out multiple cultivation methods, but it does demonstrate to us the hard costs involved in growing particular varieties."

Tractor data allows for the removal of headlands and other areas that aren't cropped, which has reduced the amount of straw being bought in (for the carrot crop) and provided a saving. "And it isn't just straw; we're saving on polythene too by using more accurate data on how much of the field is cropped, rather than just using the total area.

"Additionally, using satellite connectivity we can start anywhere in the field where the ground is best to plant and then move outwards. If we have to stop because the weather turns, we know that any tractor or operator can go back to that field and marry up to where the first tractor started, reducing idling time," he says.

It's this sharing of data that enabled the fleet to operate more efficiently. With one Fendt 724 Vario and three 720 Vario tractors there's demand for the more powerful 724 for a variety of applications. "The 724 is better suited to the HEVA seven-leg subsoiler so we want to make sure it's available to do that work. Using data from the whole fleet I can create tasks in FendtOne offboard that prioritise where the 724 goes each day and make best use of its extra horsepower," adds Adam.

And tractor telemetry data is improving the accuracy of ridging the carrots by making the spacing more precise, which has helped with laying the polyethene, he suggests. "With the Fendt system we've become accurate to the centimetre, and this has improved laying the poly which historically would blow away if the spacing was too wide."

GRANULAR DETAIL

All four tractors average 1500 hours a year with each hour of work being recorded through individual tasks that can be cross referenced. "We've broken the farm down into smaller areas of between 20ha and 40ha so we don't require larger machinery."

The farm now chooses tractors based on the hire cost and the efficiency of each task. "We must have four tractors to manage the carrot crop, the challenge is knowing how much horsepower to deploy to which task to optimise fuel and time," he stresses.

This extends to the contract farming the business operates locally too. Adam says when costing a job for another farm, he uses data from previous tasks to give accurate quotes, with the option to produce reports for customers.

"We map every field we contract farm with the Fendt system rather than go off the farm's historic data. This gives us an accurate field boundary and area, but it also forms the basis of the task I create so that once the job is complete, we can show the customer the time, seed and fuel used," he explains.

According to Adam, by operating in this way, both the farm and its customers are working with hard facts and data which can be interpreted to make savings. "For example, if we're drilling grass seed we can map the boundary and report that to the customer. We then record seed used, including overlaps, to accurately charge for the work.

"When the job is complete it can output a PDF that shows the effective and ineffective total distance and time, along with the date, start and finish time and the implements used," he says.

This enables the farm to take the overhead contract hire cost of the tractor, the cost of the operator, the machinery being used and the cost of any seed or product used per hectare and calculate the margin. "The verification of work is important to build better relationships – we want to be transparent and exact in our work."

Adam highlights that since operating the Fendt fleet and FendtOne, the farm has remapped all of its fields and found that previous field boundary data held was incorrect.

"We're also working closely with the team at Pyketts, who are monitoring the movements of every tractor remotely to manage when servicing is required. This means we can plan ahead for when a tractor is at the dealer and make sure we have sufficient machines during that time." ●

Nature NATTERS

WITH MARTIN LINES

Variety is the spice of life

As always, time is flying by and somehow it's event season again. This is our chance to study crop variety trials at the various shows and open days, and explore the latest options entering the market. I'm always eager to see new innovations and explore how they might fit into our rapidly evolving market.

For me, some of the most interesting trials and demonstrations investigate treated versus untreated plots, or establishment techniques and dates. Selecting varieties of crops to grow next year based on our successes and failures from this year's results is becoming increasingly challenging.

For one, this year's weather and disease pressure have been significantly different from those of last year and the year before. Erratic weather patterns and a changing climate certainly pose difficulties for forecasting crop plans.

For me, not putting all of your eggs into one basket with a single variety of crop seems to be the more resilient option going forward, keeping several bases covered. However, an increased number of varieties can also bring storage and handling issues which have to be planned for.

When nature is in charge, a range of different plants grow in any given field or landscape, which together balance and compete to create a stable, healthy ecosystem that supports itself without intervention. Some farmers are trying to mimic this by growing complementary varieties of crops and beneficial plants together, which are then separated after harvest.

Growing large areas of single varieties opens up the opportunity for particular pests and diseases related to that crop to run wild. That, in tandem with volatile weather, could mean significant problems for crop yields. Yet growing a mixture of varieties and crops that can either be stored separately or together after harvest could lead to reduced costs and a more resilient harvest.

While it's easy to focus on the variety we find above ground, the importance of diversity doesn't stop there. Increasingly, many farmers are showing a growing interest in the below-ground diversity. Take roots, for example. What are the different root structures and depths doing to help your soil health?

When you chose this year's varieties, did you consider their root composition? When was the last crop trial that looked at root growth? The accessibility of water may become increasingly important in the coming years, and crops with extensive root structures and depths can better access moisture and nutrients than shallow-rooted ones.

Aside from roots, should we also be looking at the soil biodiversity, alongside crop diversity? What variety and species of worms do we have in the soil? Are they helping us, and if so, how can we encourage them onto our land? Should we be measuring the levels of soil biodiversity in terms of beneficial fungi, protozoa and mycorrhizae?

At a recent event, I learnt about which beetles or their larvae eat slug eggs, pollinate crops or eat weed seeds.

It isn't just the diversity of our crops and soils which could help us to balance our accounts and maintain yields. It's the diversity we have in our fields and in hedges and edges that may help reduce costs, improve the predation of pests and increase pollination. Monitoring the number and variety of beetles, for one example, can be really useful once you realise the different species they feed on (hint – it's pests!).

At a recent event, we were learning about which beetles or their larvae eat slug eggs, pollinate crops or eat weed seeds. Who knew that having more beetles in your fields and margins helps decrease the amount of weed seed that germinates? It had me thinking: what creepy crawlies and bugs are there that I'm not monitoring which could be helping me to produce my crops while reducing my input costs?

One of the great things about *CPM* is the variety of stories and articles it publishes: from manufacturers or researchers promoting the latest product or technology, to different farmers looking at practices, techniques and crop varieties that deliver improved outcomes. Like many things in life, a single fixed model doesn't work for every farmer, every landscape or every business.

Employing a diverse variety of approaches focused on a common goal means farmers can use what works for them on their unique pieces of land. Still, the result is broadly the same – our businesses, crops, soils, and nature are healthier and more resilient because of the variety. ●

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.
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Beacon of optimism

If Groundswell hadn't garnered enough of a following in its nine-year history, this year it promises to put one of the founding fathers of the regenerative movement at attendees' fingertips. *CPM* finds out more and what else is in store.

By Melanie Jenkins

If one thing's certain pertaining to those who'll be attending Groundswell on 2-3 July, it's that they'll come away from the festival having learnt something new, made a new contact, or be feeling reinvigorated in their farming endeavours.

After last year's roaring success, where 8000 people attended, the festival is set to return to its established site in Hertfordshire for the ninth year, but this time, event director Alex Cherry, has a few changes planned.

"We don't want to expand too much because we want to maintain the feel and vibe of the festival on this same site. However, we've expanded slightly by moving the big top to the demo field which we hope will help to centralise the footfall during the event."

On the subject of things moving, attendees will also notice the glamping village has relocated to the western side of the site to allow for more car parking space, but as Alex highlights, the focus very much remains on quality of experience over quantity.

"Every year we reflect on how the festival went and what we can do next, and we used to worry that we wouldn't have enough speakers. And yet, as the tentacles of networks established through the festival grow, new faces emerge to speak and share their knowledge – this is the definition of Groundswell and the movement of regenerative agriculture."

SHINING LIGHT

"It's been interesting to see that despite everything going on in the sector, the bad news and the tough times, we're hearing optimism, ideas, innovations and people wanting to tell their stories above this – it feels like Groundswell is a shining beacon of optimism for the sector."

This year's headline speaker is travelling from 'across the Pond' to share his knowledge and experience. Known as a pioneer of the regen ag movement, Gabe Brown requires little introduction.

He and his wife Shelly founded Brown's Ranch, a diversified 2400ha farm and ranch near Bismarck, North Dakota. Gabe has also authored the bestselling book, *Dirt to Soil, One Family's Journey into Regenerative Agriculture*, is a partner and Board Member at Regenified and serves as the public face of the company.

He's a founding partner in Understanding Ag, and a founder and instructor for the Non-Profit Soil Health Academy, which focuses on teaching

Making connections
As the tentacles of networks established through the festival grow, new people get in touch and come forward to speak, says event director, Alex Cherry.

others the power and importance of healthy functioning ecosystems.

"I don't think anyone in this sector is as 'in demand' at this moment as Gabe," says Alex. "I think a large portion of the farmers attending Groundswell were inspired by reading his book – so seeing him in the flesh will be a big deal."

Gabe will have a busy schedule across the two-day festival, from hosting various speaker sessions to taking groups out with cattle in the fields – providing plenty of opportunity to meet him.

Another keynote speaker at the festival is Didi Pershouse, who'll bring her holistic approach to soil health to proceedings. According to her website, Didi is an author, educator, and soil sponge strategist.

Didi's books, *The Ecology of Care* and *Understanding Soil Health and Watershed Function*, cover her own life and how to care for people and the Earth at the same time, as well as understand how to secure abundant clean water, and resilience to flooding and drought, by working with nature's simple principles and processes.

A third keynote speaker, Rob Hopkins, is an environmental activist and founder of the Transition movement, which is a grassroots initiative started in Totnes, Devon. He's also the author of several books including, *From What Is to What If*. An Ashoka Fellow, he's spoken at TED and has hosted 100 episodes of the podcast *From What If to What Next*.

The festival is also set to host various policy sessions with an appearance from NFU chairman Tom Bradshaw. "Defra will be represented, and we will provide an opportunity to hold policy makers to account," notes Alex.

"I hope the festival will inspire this Government to see agriculture as something positive to put their time and energy into."

With a record number of speakers – over 400 – booked for the festival, new 'mini' venues have been established to host sessions and break-out talks.

One new setting in particular is the Book Worm tent, which has been created specifically for authors to allow for greater connection opportunities between them and attendees. "We want to provide more scope for 'out there' talks that promote conversation beyond mainstream farming, and which can inspire ideas and communications within and outside the sector," says Alex.

This year will see the return of the Agroforestry tent which has been expanded in-line with increasing interest in this area, he explains. "The tent was so busy last year that we've introduced a new design clinic tent providing free consultations which attendees can book in for. It'll provide a chance for agroforestry blue-sky thinking, or alternatively, farmers can bring their own plans in and discuss what they want to achieve."

British Wool will be present in a collaborative tent which will look at the supply chains for the product, while Pasture For Life, which has come on as a festival partner this year, has a jam-packed programme, says Alex.

Additionally, the Wildlife Trust has increased its presence with a packed-out programme of speakers in the Farming with Nature stage. "It's been received very well by Groundswell attendees with so many things to learn from the re-wilding movement and nature recovery in general."

AHDB has planned a number of sessions in its giant tipi, ranging from 'don't let weeds take the lead', to 'seeding changes with the AgriLeader Circle'.

EXHIBITOR LIST

Exhibition space is completely sold out with a diverse range of organisations set to attend. One of these is New Zealand start-up, Kiwi Econet, which has created an edible bale wrap made from flax that's safe for cows to ingest.

For those looking to enjoy the heightened cuisine opportunities Groundswell offers, this year the festival will again be hosting a banquet. Delivered by Salsa Rose, and Fielden Whisky, it'll consist of a three-course feast on both the Tuesday and Wednesday evenings, with the menus explained by the growers who produced the food, details Alex.

"What's really cool about the food at the festival is that a lot of the independent traders are farmers cooking their own produce, creating micro businesses or diversifications to support their farms. There's also examples of food brands collaborating with regenerative farmers to help them tell their story and create bespoke pop-ups for Groundswell.

"I think it's exciting that Groundswell is inspiring people to rethink supply chains and help farmers escape the commodity juggernaut."

Those after the 'full' Groundswell experience will be glad to hear there'll be an increased number of activities for campers and glampers, including more early morning yoga sessions and a wood-fired sauna. "We're also excited for the great line-up of music we have planned and it's safe to say that Andy Cato will be back on the decks on Wednesday evening," adds Alex.

Groundswell is taking place on 2-3 July at Lannock Manor Farm in Hitchen and is hosted by the Cherry family. For further information and to enquire about tickets, visit www.groundswellag.com

More time for talk

With a record number of speakers booked for the festival, new 'mini' venues have been established to host sessions and break-out talks, while a number of tents have expanded.

Festival vibes

Groundswell's festivities continue each evening, with live music and banquets planned.

Draining resources

In some instances, drainage schemes installed in the heydays of the 1970s and 1980s are proving no longer fit for purpose. *CPM* finds out why this could be the case and asks what can be done to put matters right.

By Mike Saull

There's every chance that heavier textured soils tended daily on-farm have been drained in the past. But whatever the reason and the scheme that was installed then, with a hand on heart, can it be said they're currently at their best?

Recent weather event trends have brought this into sharp focus, with some growers unable to establish crops during wetter autumns. Equally, it's becoming increasingly difficult to maintain or develop good soil health on fields that are quicker to reach their capacity.

According to Kirk Hill, technical director of the Soils and Drainage Team at ADAS, a lack of investment, care and attention are often to blame. "Realistically, many farmers will find drainage schemes installed under grant 50 or so years ago may be coming to the end of their useful life.

"Much will depend on the maintenance these systems have received, and the key will have been to keep outfalls clear and running to prevent pipes from silting up," he explains.

"With the possible exception of the

Pragmatic view

Realistically, many farmers will find drainage schemes installed under grant 50 or so years ago may be coming to the end of their useful life, believes ADAS' Kirk Hill.

Being honest

According to William Morfoot's Tim Sisson, farmers should be honest and realistic about the state of the drainage on-farm.

low laying parts of East Anglia – where any neglect of drainage can result in more immediate, obvious and costly problems – pressure of other farm work often means maintaining drainage slips down the agenda. This can impact on the efficiency and success of in-field operations, as well as becoming more expensive to mitigate in the end."

Kirk says subsoiling can help to remove soil structural damage and allows excess water to escape into gravel backfill above field drains. However, years of loosening will have redistributed the gravel reducing connectivity and drainage effectiveness.

"Risks have ramped up during the past 10 years or so on the back of climate change. As a result, it may pay to re-evaluate the likely £3000-4000/ha costs of a new system against current and potential future crop values," he continues.

"Don't base your £100,000+ investment decision on one major rainfall event. Check soils first as poor soil structure could be a major contributing factor. Ensure ditches and existing drain outfalls aren't simply blocked; moling or jetting may be another option (see box) that could enliven your existing system."

New approaches are commonly based on the experience of the contractor employed and there's no doubt that the vast majority do a great job using well-established drainage design principles, he adds.

"My advice would be to spend time looking at pipe sizes and spacing to cope with heavier and more frequent rainfall events," says Kirk. "For example, while the previous standard recommendation of 60mm lateral pipes with gravel backfill may technically be sufficient, a slightly larger pipe and gravel trench may give greater system longevity and be a better investment in the long run, particularly if you frequently subsoil.

"Growers have to ask, is the existing system satisfactory and are there reasons why drainage may be inadequate for current requirements? For example, land use may have changed since the system was installed and the scheme no longer works for today's cropping regime."

STONE BACKFILL

Another reason why an existing system may deteriorate can be the lack of stone backfill used, he believes. "On heavy soils I'd always recommended gravel-backfilled drain trenches. Where soil backfill is used, the scheme may work well initially, however, over time, the soil aggregates formed during drain laying will deteriorate to a less permeable condition that reduces the rate of water movement.

"It can be difficult to recognise the signs of crop stress on fields where old drains are gradually becoming less effective and where only some crops in the rotation may be affected by stress. But, look at the history of the field and whether the field's accessibility or productivity has been deteriorating, or pest susceptibility increasing, as the years go by," suggests Kirk.

Tim Sisson of Norfolk-based William Morfoot agrees that many 40-year-old schemes are now not fit for purpose. "We're now running four trenching machines all year-round and most of our work is replacing tired and worn-out schemes that have failed.

"Old schemes were often installed with little or no gravel over the pipes and in heavy clay subsoils, and the drains have effectively become capped so that water can't filter into them from the surface.

"Trenching equipment and technology from that period weren't as good as today so shallow pipe depths and inconsistent grading are commonly seen. Broken and worn-out clay drains are another common sight making water flow impossible."

He believes that ditch systems have also been commonly neglected – meaning outfalls are below sediment in ditch beds. "And because drain jetting has rarely been undertaken, root ingress and sediment build up ▶

Moling moves

Moling or jetting can be a low-cost way of rejuvenating a failing drainage system but these techniques only work if permeable fill is in place and soil structure allows good waterflow

Mole draining – suitable on very heavy and calcareous clays – every 5-10 years is as cheap as chips and highly effective when carried out at the right time, believes ADAS' Kirk Hill.

He says soils should have a minimum of 30% clay and less than 30% sand to hold them together with a reduced risk of the channel collapsing after the mole is pulled. "Mole channels established in very stable soils with 45% clay content can last more than 10 years, but a typical lifespan ranges 5-10 years."

Mole channel life can be reduced where patches of sandier soil occur leading to premature collapse, whereas bad cultivation or traffic management can seal off the routes by which water reaches the mole drains.

Moling should be carried out when the soil in the vicinity of the mole channel is moist enough to form a channel but not dry enough to crack and break up, and not soft enough to slough off and form a slurry.

Before moling, Kirk advises checking the soil at working depth is plastic, in that it forms a 'worm' without cracks when rolled on the hand, and that the surface soil is dry enough to ensure good traction and avoid compaction.

He adds that the drier the soil above moling depth, the greater the fissuring produced, the longer the life of the channels produced, and more efficient the water removal.

These conditions are most likely to arise during May to September/ October depending on the season and location. Often, the best, most stable moles are produced as the soil is drying out – so those installed early season – and through a crop, and this is where a cover crop can help.

Identifying blockages

Sediment build-up within pipes can be a major problem. *Photo: ADAS.*

within the pipes is a major problem."

Tim's view is that farmers looking at maintaining existing schemes should start with the basics. "Gather up existing historic paper plans and have them digitised; read and understand them carefully and make sure they're 'as-built' drawings and not just proposal plans. Get an organised system in place whereby all concerned with the farm can access them."

After this it's a case of maintaining and looking after the ditches, he says. "Use a professional contractor to clean them out and spend time locating, finding and marking any existing outfalls before the digger bucket comes through, ensuring the integrity of the drain is preserved.

"Clear the outfall end of any sediment and debris and ensure it's positioned with adequate levels of freeboard above the water level in the ditch. Walk these drains and ditch systems when soils are at field capacity and record where they're working well or badly.

"Jet them and spend time investigating problem drains to determine if the schemes were installed with acceptable quantities of gravel backfill and whether the pipes are installed at the correct depths and gradients."

Above all, Tim says farmers should be honest and realistic about the state of their drainage. "Don't invest time and effort trying to revive a scheme which is clearly no longer working. For example, there's no point mole draining a field if there isn't a comprehensive stoned piped system within it.

"We often find people can make drainage conditions worse by carrying out 'recreational moling' where there's no viable outlet for the water," he comments.

As a result of a resurgence in drainage interest, William Morfoot is now working 12 months a year delivering large-scale schemes using working windows around winter and spring crops. Scheme sizes have been getting larger in recent years and data from yield mapping and satellites indicate typical yield increases of 25-30% after installing a new system.

"Given this level of yield uplift, many growers are asking themselves the question: 'what's the opportunity cost of not investing in land drainage?'. Then there's the benefits of improved timeliness and crop uniformity alongside lower chemical, fertiliser and seed inputs," explains Tim.

RETURN ON INVESTMENT

"Finally, with increasingly extreme rainfall events such as those seen in 2019, 2020 and 2023, many growers are seeing rapid payback times on drainage investment from being able to drill in wet autumns on land that previously couldn't be touched."

Rob Burtonshaw, director of Warwickshire-based Farm Services, reports a similar resurgence of interest in drainage. "Old schemes have been neglected and ignored for a long time and issues have built up. Soil condition is given much greater attention now than it was in the early 2000s, but many of the regenerative techniques now being practiced won't work if the soil is wet.

"Most are looking to push forward yields and this can be impossible without good drainage, so we are the beneficiaries," he says.

According to Rob, trends toward minimum tillage can mean a narrow window of opportunity to drill in ideal conditions, however, the right drainage can help. "If a crop is drilled well, it'll yield well.

"Our approach will always be to try and work with any existing drainage system – to repair if possible and if not, to connect any working existing drains to the new scheme. As a result, I've connected to drains that were around 80 years old and laid by my grandfather, but this isn't common and even where we have old plans, this is often not worthwhile or possible.

"Where we used to see farmers redrain a small 20ac [8ha] field that always lay wet and wouldn't crop consistently, today's schemes are much bigger for farmers that are in it for the long haul and prepared to invest," he says.

Rob adds that most growers report yield increases of around 20% after installation, but this varies. "One estate we worked at recorded 35% increases and where fields are drained where crops commonly failed due to waterlogging, suddenly securing an 8t/ha cereal yield is very significant.

"By and large, our business is based on farmers wanting to push forward – those thinking long-term. Design is left to us and based on established principles following research in the 1970s. It depends on soil type but most of our schemes use gravel backfill.

"Using gravel as permeable fill lengthens the life of the scheme, but it's all horses for courses and on lighter soil where you're simply controlling the water table, you don't necessarily have to fill," explains Rob.

All of Farm Services' schemes are now installed using GPS grade control which ensures good falls across the field, using trenchless or trenching machinery that's much quicker to operate. Equally, trenching is more common if there are existing drains that have to be connected to the new scheme, concludes Rob. ●

GPS-driven accuracy

GPS grade control ensures Farm Services can deliver accurate falls across a field.

Going with the grain
– what to consider when selecting storage

Getting grain storage right can make all the difference when it comes to crop profitability. *CPM* explores the key considerations before investing in something new.

By Charlotte Cunningham

Grain storage might not be the hottest topic on the farm, but it's arguably one of the most crucial. With margins tighter than ever and crop quality paramount, investing in the right storage and drying infrastructure can be the difference between a profitable season and a costly disappointment.

When done well, a good storage setup protects the value of a crop, affects long-term profitability, and impacts the overall efficiency of a business. "While it may sound obvious, the importance of proper grain drying can't be overstated," says Charles White, director at Tornum.

"Once grain is harvested, the race begins to remove moisture quickly and safely. Failure to do so risks the development of mycotoxins and spoilage, both of which can ruin a crop's marketability.

"We're aiming to get that grain dried as fast as possible to preserve quality, prevent waste and reduce risks. Then it's all about getting it cool and stable – ideally below 10°C by Christmas – to ensure long-term storage without deterioration."

So, where should growers begin when thinking about a new storage system? "First and foremost, ask: what am I trying to achieve?" advises Charles. "Budget is obviously a key factor, but so is understanding how much grain you're moving and how fast it comes off the field. That'll influence the size and spec of the system you require."

For smaller farms, simpler and lower-capital systems might suffice, such as 10t/hr dryers with handling equipment at around 30t/hr. But larger arable businesses – those with more than 400ha to store – are frequently installing 40t/hr dryers with handling capabilities of up to 80t/hr or more, he explains. ▶

In terms of the physical storage itself, this comes down to a decision between silo stores or flat stores – and a lot of this decision making will be influenced by cropping plans and whether short- or long-term storage is planned.

"Silo storage is ideal for large, single-crop volumes and offers efficient vertical storage with minimal footprint," explains Charles. "However, it comes with reduced flexibility. Silos are typically designed for one crop type, so if a farmer changes their rotation or volume in future seasons, the setup may become less optimal."

Flat stores, on the other hand, offer adaptability, he adds. "Not only can they be divided to hold different crop types, but once emptied, they can double up for machinery storage or other uses. If designed correctly with proper aeration and control systems, these buildings can qualify for up to 100% capital allowances – an important financial consideration and a huge incentive.

"It's important to think beyond just the physical storage and instead also consider long-term value, energy efficiency, and how it fits with the rest of the farm."

Another area to consider is planning

Capacity conundrums

In terms of the physical storage itself, this comes down to a decision between silo stores or flat stores – and a lot of this decision making will be influenced by cropping plans and whether short- or long-term storage is planned.

How to future-proof crop storage

1. Start with goals – Know what the storage has to achieve. Is it long-term? Quick turnaround? Multi-crop use? What kind of fuel will be used?
2. Know the volumes – Harvest size and speed will dictate the scale of dryer and handling kit required, as well as the space physically available on farm
3. Budget smartly – Good systems aren't cheap, but pay dividends; a £100k setup is possible, but expectations must align
4. Factor in flexibility – Think ahead: will cropping change? Should it be a multi-use shed?
5. Explore available incentives – Capital allowances and energy savings from smart controls can make a significant difference to ROI

permission. Many grain stores are now being designed to fall within the 1500m2 permitted development allowance, enabling farms to avoid lengthy and costly full planning applications. "We're seeing more and more projects go down that route – it just makes the process quicker and easier," says Charles.

Beyond capacity, developments in technology that complement storage systems are aiding energy efficiency, with Tornum's Intelligent Dryer Control (IDC) system a good example of how tech is helping to reduce energy waste and preserve crop quality.

IDC uses advanced sensors to monitor incoming and outgoing moisture levels in real time. By eliminating over-drying – which Charles says is a surprisingly common issue – farmers can significantly reduce fuel use and minimise unnecessary weight loss, both of which have a direct financial impact. "It's one of the most effective tools we offer," says Charles. "It can show real savings straight away and most of our systems now come with IDC as standard.

"Over-drying is where a lot of money gets lost. You're wasting energy and losing grain weight," highlights Charles.

Race to preservation

Once grain is harvested, the race begins to remove moisture quickly and safely. Failure to do so risks the development of mycotoxins and spoilage, both of which can ruin a crop's marketability.

Looking at the numbers, while the industry standard for drying is 13%, bumping this to 14% can typically add up to 20% to energy bills while also reducing drier capacity by up to 16%. "Our system constantly monitors incoming and outgoing moisture, adjusting the drying process in real

time. It's saving significant energy and reducing unnecessary weight loss."

For flat stores and post-storage drying, Tornum also supports Barn Owl Wireless – an intelligent ventilation system which, rather than pushing air across an entire floor, pinpoints hotspots and ventilates only where required.

The result? Up to 40% energy savings and better grain preservation. "It uses real-time humidity and temperature data to ensure it only comes on when the conditions are right, so for many it's a smart and cost-effective investment," explains Charles.

Grain cleanliness is another growing concern and something to factor in when planning new storage, he says. "We're seeing more interest in optical sorters for removing blackgrass, ergot and other contaminants. It used to be a niche product – now it's becoming more mainstream."

Using alternative fuels for drying is also coming to the fore. Tornum has worked with clients using biomass and hot water coils, although Charles notes these systems require significant boiler capacity – usually a megawatt or more – to make a real impact.

"We know storage isn't glamourous but investing in smart, efficient and flexible infrastructure is more important than ever, and with the right solutions, farmers really can help to reduce waste and future-proof their businesses."

Post-harvest solutions showcased at Cereals

Post-harvest grain management was a key theme at this year's Cereals Event, with several new launches on display to help growers better safeguard quality and make every tonne count.

This included Plug&Cool's Outdoor 2.2kW fan, designed for underfloor cooling systems. Built to weather rain and temperature extremes, the externally mounted fans deliver high airflow while standing up to harsh conditions — making it ideal for long-term installations, says the firm's Rael Bearman.

For Alvan Blanch, the DF6000 was the star of the show – a high-capacity continuous-flow dryer designed to handle all crop types with minimal intervention.

"The beauty of this dryer is its flexibility," says Simon Shaw, the firm's head of sales. "You can switch between crops without having to empty or pre-clean. Plus, it's designed with safety in mind — fewer hot spots and full access via hinged doors make it a much lower fire risk."

DF6000 combines engineering with smart tech and uses advanced sensors to remove just the right amount of moisture, protecting both quality and energy usage. "It's really a fit-and-forget system," adds global marketing exec, Isha Deshpande. "Once it's running, it just works — giving growers one less thing to worry about during the chaos of harvest."

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"We used it to load grain lorries on a neighbour's farm and were pleasantly surprised by its performance."
THOMAS REEVE

Having tried out multiple machines while looking to upgrade, a north Suffolk family turned to Case IH when purchasing a new telehandler, mostly based on the firm's tractor performance. *CPM* shares their story.

By Martin Rickatson

During the past couple of decades, almost every mainstream tractor manufacturer with ambitions to offer a full line of farm equipment has entered the telehandler sector. While some have chosen to buy up existing firms, others have opted to commission material handler specialists to build machines on their behalf.

Others still, though, have gone down a third route and chosen to manufacture their own design from scratch. Back in the late 1990s, the 'sourcing from a specialist' route was the one selected by the business that would later form one part of today's CNH. Some years later, though, it was to develop its own side-engined machines, latterly offering them through both its brands.

This is how in 2014, the colours of Case IH came to be seen for the first time on a telehandler. The range of Farmlift models comes from the CNH plant in Lecce, Italy – one of the Case IH parent's largest global factories, on a site of almost 60ha.

Here the Farmlift handlers are assembled alongside backhoe loaders, wheel loaders, construction telehandlers, compact wheel loaders and graders. Key components are manufactured in-house, including chassis and booms.

FAMILIARITY

An agricultural telehandler market dominated by three big brands, with a couple of others not far behind, meant breaking into the sector was likely to be a challenge, but with the Farmlift line offered alongside a tractor brand with a prominent position in the market, Case IH telehandlers have often found homes with buyers who

already operate the brand's tractors.

One such buyer was Suffolk-based family business HP, ME and TJ Reeve, which runs a 200ha all-arable unit and provides contracting and contract farming services from its base at Walsham-le-Willows, near Bury St Edmunds. Last year, the family purchased its first Case IH telehandler, a Farmlift 742, but they're keen to stress they're no strangers to Case IH tractors or their local dealer.

"After we moved from running a tractor-loader, we operated Matbro telehandlers, and then John Deere machines when Deere bought Matbro and moved to making its own models in Germany," explains Thomas Reeve, who oversees the day-to-day management of the business with his father, Hugh.

"The first was a Matbro Telestar followed by a TS280, and following the John Deere acquisition, we later purchased our first JD telehandler, a 3420.

"We worked very well with it, and that was the first of three similar machines in a row. But when John Deere pulled out of manufacturing telehandlers, we had to look at other options."

TIPPING POINT

Thomas says the business kept its last JD machine on for a while longer than planned, supplementing it with a Massey Ferguson 9407. "By last year though, the John Deere required a lot of money spending on it to renew the boom hydraulic pipework and we thought this could be the start of something more expensive, so decided to make a replacement decision.

"At the same time, the MF wasn't great on the road or for towing and was 12 years old, so while we considered retaining it for back-up, ultimately the decision was made to sell both, and replace them with a single new machine," he explains.

In addition to covering their own ground, the family works for 11 regular customers, spraying around 800ha with a Sands self-propelled, drilling 1000ha with a Vaderstad Rapid, and covering complete stubble-to-stubble work on 400ha, combining with a Claas Lexion 760.

"Although the land is mostly neighbouring ground in a block, that means plenty of running around with a telehandler and trailer loads of seed or fertiliser. At these times it's nice to have a handler in the field and one

Two in one

The Farmlift 742 has taken on the workloads of two traded-in telehandlers of different makes.

in the yard, but having two handlers is a luxury really, particularly since we stopped growing sugar beet.

"Part of me wanted to keep a second machine for lighter duties, but in the end we chose to trade in both against one new machine."

The question was what to replace them with. With this in mind, the Reeves say they like to support a number of their local dealers, and also pick the ideal machine for each role on the farm.

"Most dealer depots are 30-40 minutes from here, and we've never had particular loyalty to makes of key machine, although we've always had Claas combines, currently running a 2016 Lexion 760.

"But alongside two high-hp crawlers – a John Deere 8370RT and an Agco Challenger MT765C – we run two Case IH wheeled tractors, a Puma 175 and a Puma 240, for the main parts of our workload.

"We have a long history of operating Case IH tractors, going back to the 1990s and before then with its predecessor brands. We also get on well with our local Case IH dealer, Ernest Doe at Framlingham, so that gave it a foot in the door," explains Thomas.

REALISM

Having demoed yellow and green/silver alternatives but finding they couldn't offer anything extra, he believes the cost to change – once taking into account the two proposed trade-ins – was too much.

"Being an arable farm that mainly has to move grain, seed and fertiliser, we don't require all of the bells and whistles, and performance and manoeuvrability when loading lorries is probably most important.

"So we looked at other options outside the mainstream, and spoke to our Case IH dealer about demoing a Farmlift. The quoted price was considerably cheaper than for the others we'd considered, and while it was perhaps a slightly lesser-known quantity, we knew the machines had been on the market for 10 years and that our dealer had sold a good few."

This led to an on-farm demonstration with a Farmlift 742, Case IH's largest 7m model, with a 4.2t lift capacity, 146hp (max) FPT engine, 6F/3R powershift transmission, and 140 l/min hydraulic system, with 160 l/min option.

"We used it to load grain lorries on a neighbour's farm and were pleasantly surprised by its performance," comments Thomas.

"In particular, it was especially nimble around the yard and buildings. We have one new grain building but our other sheds are fairly old and not especially big, so something that'd help to negotiate them quickly when entering and exiting while loading lorries was appealing."

He believes the lift height of 7m is adequate for the business' requirements. "We aren't making large bale stacks or pushing up grain in a big store, so a lift capacity of 4.2 tonnes

Powered up

Having sufficient power on tap means virtually no right foot is required when driving into grain heaps, says Thomas Reeve.

is therefore sufficient, easily handling a 2.25t bucket for grain loading.

"The Farmlift was also simple in its design and its controls, seemed well-built, and had good all-round vision, with a decent cab that has an interior look that's a little similar to the Case IH Puma tractors we own."

The demonstration was sufficiently impressive to agree a transaction, particularly as the dealer was happy to put a modest value on taking in the John Deere and Massey Ferguson handlers in part-exchange, further reducing the cost to upgrade.

"It has the features we want without the frills we don't require because we're in and out of the cab a lot, and not spending solid hours in it," suggests Thomas.

"Aspects like the reversing fan are especially useful, for example, when loading many lorries in a day or working with our bucket brush. Being able to automatically or manually reverse the fan direction to blow out the radiator screens is much nicer and easier than stopping to clean by hand, and ensures the engine always has access to sufficient cooling air so doesn't get hot."

Familiarity

The Reeve family's long history with Case IH wheeled tractors and their local dealer were key factors in the decision to purchase a Farmlift.

The Farmlift's main duties comprise loading grain lorries and the farm's drill and fertiliser spreader, although it also works with an access platform, a dirt bucket and hydraulically-powered bucket brush.

"Changing telehandler makes can be a pain if it's necessary to also change attachments, because of the differing headstock types between manufacturers," points out Thomas. "But with an adaptor we've been able to retain and continue to use all our existing attachments with their Matbro-style pin-and-cone fittings on the hook-type headstock of the Farmlift."

SO FAR, SO GOOD

Delivered in August 2024, by May this year the Reeves had put just over 400 hours on the Farmlift. And so far, Thomas believes it's done everything asked of it without issue. "The power and fuel efficiency are especially good," he says.

"Having sufficient power on tap means the machine requires virtually no right foot when driving into a grain heap during lorry loading. It's rarely necessary to use a lot of revs to do anything with it really – the powershift works well and it's just a case of slotting it into gear and touching the throttle to take off smoothly."

It's also proved happy to take on haulage duties when drilling or fertilising, pulling an NC trailer with a full load of bags. "It's not hilly around here, but it pulls a trailer well and on this sort of job or when loading out grain, the cab is a decent place to be, and quiet enough."

Improved manoeuvrability

While the Reeve family farm has one new grain shed, the yard and other buildings make manoeuvrability important.

The Farmlift has settled in well and proven plenty capable in its first year on the farm, comments Thomas, the only issue being a suspected slight tyre defect with one of the front Trelleborgs that the dealer is striving to address.

"I'd like to think it'll do five or six years with us, clocking up around 2500 hours before we look to replace it. But the cost to change is always the biggest factor, and new machine prices seem to keep rising."

According to Thomas, the dealer makes a significant difference. "The good support for the tractors we've had from them during the years was a big factor in our decision to take on the same make of telehandler.

"Because we've gone from two handlers to one, we do now sometimes have to plan jobs a little more carefully if the Farmlift is in the field and we find we want something doing in the yard.

"There are times I wonder if we should have kept one of our previous machines, but both required money spending on them which convinces me this was the right decision. We could always hire a handler if we decided it was necessary, and some of the farms we work on have one of their own that we can use."

Although some manufacturers have left the telehandler sector, when those particular handlers were introduced, there likely wasn't as much competition in the market as there is now, believes Thomas.

"Today it seems there are more makes available, but we considered the Farmlift against most alternatives and it gave us the best blend of the features we wanted at the right price," he concludes. ●

Talking TATIES

WITH ANDREW WILSON

Chalk and cheese

Contrasting years don't vary much more than 2024 and 2025. We finished planting this year's crop more than a month earlier than last year and are currently at a point where all pre emergence herbicides are on, the earliest crops have had two blight sprays, and it's still a week before we'd finished planting last year!

Is this a good thing? Mostly, yes. Crops went into moisture in most cases, and that together with some higher temperatures, has pushed things on nicely. As is the case in most years, my chitted crops are a fortnight ahead of the unchitted, having emerged 19 days after planting and reached tuber initiation by the end of May. The trade-off of warmer days and some rain of course, is blight pressure, and the demand for irrigation.

I have a soil moisture probe in one field to add some structure beyond my hand to our irrigation decisions. At the driest, even before emergence, field capacity went down to 44%. We then had just above an inch of rain spread over a week, which pushed it up to 57%, but it's dropped back a bit since.

As I write this, we're just about ready to irrigate potatoes and have a reel on some beet, but irrigating isn't a job we get excited about here. We have quite a lot of kit to water in various locations but it's all antiquated – we don't have the luxury of nice electric boreholes controlled remotely and underground mains with well-placed hydrants, so it's all rather 1990s and hard work.

The juggernaut that is blight seems to gain momentum every year and with an ever-reducing armoury to control it, extra vigilance and attention to detail is vital. Early season mancozeb has been the backbone and later brought multi-site activity among its attributes as primarily a partner product. It's been around for more than 60 years but will be no longer a tool that we can use in the UK after this season.

My thinking, as ever, goes back to basics. Copper is the mainstay of organic blight control, and is a component of mancozeb along with zinc (as underrated a nutrient as calcium in my opinion) and manganese, which is nearly as essential as the oil in an engine.

It makes me consider how mancozeb came about, and why those trace elements are within it – it's obviously for a reason. There's more to blight control than nutrition of course, but this season we're researching and trying biological trace element products containing these important nutrients.

This principle will be used in a tank mix with cymoxanil or dimethomorph as the demand arises, but not too frequently. I'm also to attend the mancozeb summit at Rothamsted Research next week, so will undoubtedly learn more there.

Mancozeb is but the tip of the iceberg though. CAAs need spacing out, if for no other reason to protect cyazofamid (Ranman) which has played a part in improving the efficacy of contact weed control, sprout control and desiccation here in recent years.

Mandipropamid (Revus) is usually an early season product of choice particularly where we can irrigate, with propamocarb (Infinito) used later on. Resistance to oxathiapiprolin (Zorvec) is a cause for concern, so it will be held back in case we have a case to 'roll out the big guns', which for us is usually late August.

On a more positive note, fluazinam resistance appears to be restricted to Scotland, so that will see a little more use than of late primarily as a partner product, likely alternated with cymoxanil.

There are many salespeople around plying their wares of the next big thing in agronomy these days. For years though, we've had good results from placed biostimulants against rhizoctonia, so using them proactively on the foliage against early dying syndrome too seems a sensible idea. Planning is important though; they have to be on before high sun or drought stresses the crops too much.

My beet is a mixed bag currently, with the line where soil types change very visible. Where it's good it's very good, but there's about 15% of it struggling at the moment. Such things can soon knock the finances of the crop into a negative position, so we're irrigating it in an attempt to strengthen any weak plants.

Aphids have fortunately left it alone so far, and the next job to do to the crop is to scruffle it (inter-row hoe) to knock out weeds and mineralise some nitrogen. It's rare to not see a positive response to this from the crop – unfortunately that feel good factor doesn't extend to the operator!

Cereals have plenty of variation. Winter barley looks good to drive past but it's too easy to walk through it, it just lost too many tillers over winter. Wheat is mostly okay bar two fields with a patchwork of burned off areas where blackgrass has shown itself to be present.

In the workshop we're about halfway through the pre-harvest servicing. Trailers particularly get a full strip down of hubs and brakes, greaseways cleaned, bushes checked and any worn pipes, wires or tyres replaced as necessary. One trailer is ready for a new floor at 17 years old, but is in otherwise decent condition so it will be done. We document all of this work in a file and are considering a rolling road test when we get them all serviced.

Downtime and accidents are more expensive than proper servicing in my opinion, so it's best to be thorough. ●

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

The challenge continues

Lessons from Europe point to how to control resistant strains of late blight, but the level at which this demands growers to engage with integrated resistance management worries experts. *CPM* reports...

By Rob Jones

The spread of late blight strains resistant to some of the most frequently used fungicide groups and the risk these pose to crop protection programmes is causing concern, according to researchers and product manufacturers.

Although fungicide resistance isn't a new phenomenon, earlier instances such as the spread of fluazinam-resistant 37_A2 ('dark green 37') and metalaxyl-resistant 13_A2 ('blue 13'), were contained with reasonable ease through changes in application practices. But it's the emergence of strains with resistance to CAA fungicides such as mandipropamid, and OSBPI fungicides such as oxathiapiprolin, which arguably pose a challenge of a different magnitude.

"Newer genotypes EU_43_A1 and EU_46_A1 have demonstrated resistance to both CAA and OSBPI fungicides, and sub-populations of some newer genotypes are more virulent, able to overcome what have been identified as major resistance genes of cultivars.

"This is concerning because these genes are central to breeding varieties with improved resistance," stresses Bayer's Tom Astill.

Breeding innovation and plant protection product development are long-term programmes with progress in one area often reliant with that in another, he adds. "The loss of resistance genes seen as integral to cultivar development undermines efforts to preserve fungicide efficacy for future seasons.

"We'll have to find new ways to control late blight, including through the wider use of decision support systems and in-crop monitoring tools, while continuing to practice responsible resistant management," urges Tom.

To highlight the threat that these strains pose and the response required to contain them, Bayer recently hosted a seminar for growers and agronomists.

The role of infected seed in enabling the spread of these new strains was among the key topics covered.

Research in 2011 (Zellner et al.) found that of the seed potato batches tested, on average 11% carried a latent late blight infection. In today's context, EU_46_A1 has been detected in Poland and given around 80% of the seed potatoes planted there are supplied by Germany and the Netherlands, transmission of late blight

The bigger picture

The loss of resistance genes seen as integral to cultivar development undermines efforts to preserve fungicide efficacy for future seasons, stresses Bayer's Tom Astill.

Growing concern

Late blight poses a significant crop protection challenge, but while it's not the biggest threat, the loss of fungicides and the spread of resistant strains make managing it more difficult and expensive, says Miles Forber.

in seed could explain how these new strains have spread so far so quickly, other than by air-borne spore transmission.

In the UK, growers should be cognisant about seed transmission and continue to manage primary inoculum sources by controlling volunteer potatoes and destroying or covering out grade piles, says Tom. "Ensuring crops remain protected in the face of these new threats means mixing modes of action and using active substances recognised to give sufficient protection.

"For instance, suggestions that solely including cymoxanil with mandipropamid as a means of combating CAA-resistant 43_A1 is not responsible, as although cymoxanil is another mode of action with activity on late blight, it will give only 2-3 days of protection which is insufficient," he reminds.

"It's similarly important to maintain dose rates; the QiI amisulbrom is a popular mixing partner for CAA and OSBPI fungicides but be sure to maintain the full application rate. Bayer glasshouse trials indicate that amisulbrom at 60% dose will give 20-25% control of EU_43_A1 isolates with resistance to both CAA and OSBPI fungicides. At the full rate, this increased to more than 70%."

According to Tom, resistance management guidelines produced by Aarhus University have resulted in a dramatic fall in the frequency of EU_43_A1 since 2023. "Up until 2022, growers in Denmark made regular applications of mandipropamid, often up to six times in the programme.

"They've since limited its use to just two applications and always in a mix with a reliable partner. Also there have been fewer applications of mandipropamid at the start of the season to reduce early selection for EU_43_A1," he explains.

To protect the efficacy of Infinito (fluopicolide+ propamocarb) and other propamocarb products, Bayer has published updated guidance for the 2025 season.

Tom says propamocarb continues to be effective against late blight with no reports of resistance. "To reduce the chances that this might change, propamocarb should always be applied in mixture with another fungicide with sufficient activity on Phytophthora infestans and in alternation with fungicides from a different cross-resistance group."

Furthermore, Bayer advises that no more than 6060g propamocarb is applied per hectare per crop in 2025.

From a grower's perspective, the spread of late blight strains resistant to some widely used fungicides has added cost and complexity to fungicide strategies. For Myles Forber, technical manager at Chatteris-based grower A & EG Heading Ltd, this has increased the agronomic risks at a time when business confidence is already under pressure.

"Late blight poses a significant crop protection challenge, but while it's not the biggest threat we face, the loss of fungicides and the spread of resistant strains make managing it more difficult and expensive," he says.

Miles adds that it's the nature of the ▶

▶ disease too that causes concern, especially when seeking to balance fungicide applications within a standard seven-day irrigation schedule.

This is because EU_36_A2 – the dominant strain of late blight in England – can produce more than 800,000 spores per cm2 of lesion every seven days. A latent period – the duration between when a host is infected and symptoms appear, becoming infectious – of just four days means once an infection is created, it quickly produces spores.

"Blight control during the tuber bulking period is the most challenging because of the crop's demand for water. We can't afford to stop irrigating to spray crops, so applications during this period have to be well-timed and robust," comments Miles.

"There's also the need to recognise that other crops around us can serve as a reservoir for infection. There's a large area of irrigated potatoes on the Fen and blight spores have been known to be carried great distances on the wind, so we can't afford to think of our own crops in isolation," he stresses.

Of particular concern is the resistant strain EU_46_A1 which was found in Wales and Scotland in 2024. Sensitivity screening revealed resistance to the OSBPI mode of action group featuring oxathiapiprolin (as in Zorvec). Another concern is EU_43_A1, which although yet to be detected in Great Britain, is resistant to CAA fungicides such as mandipropamid (as in Revus).

Managing the threat posed by new and established strains comes down to having a balanced programme that ensures no one mode of action is exposed, believes Miles. "I'm fortunate to have enough mancozeb to serve as a mixer with straights such as Revus or those active substances with single site modes of action, notably Qil fungicides, such as amisulbrom and cyazofamid.

Propamocarb use

Having issued new guidance, Bayer advises that no more than 6060g propamocarb is applied per hectare per crop in 2025.

"What we use in its place after this season remains uncertain. Privest (ametoctradin+ potassium phosphonates) may fill the space in the early season, but after this, we don't know," he says.

There are cost implications of having to add a non-CAA mode of action such as mancozeb to Zorvec Entecta (oxathiapiprolin+ amisulbrom) and Revus, but the requirement to protect these modes of action for future seasons means many growers recognise it as necessary.

A positive of this however, is that there's scope to incorporate more applications of Ranman Top (cyazofamid) or other Qil fungicides in alternation with Infinito (fluopicolide+ propamocarb) in the final stages of the season when the anti-sporulant properties of propamocarb are useful in limiting the risk of tuber blight.

"I'm already using the maximum number of four Infinito sprays. With no known resistance this has the advantage of not requiring a third mode of action which also makes it financially competitive," explains Miles.

"In contrast, Ranman Top has to be mixed with partner products such as mancozeb, cymoxanil, fluazinam or propamocarb to guard against resistance." ●

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Balancing sugar beet and soil health

As knowledge of how to manage soils improves at a rapid pace, growers are adjusting their approach to sugar beet in a quest to offset sustainability concerns regarding the crop. *CPM* hosts this month's Common Ground discussion to find out more.

By Janine Adamson

In many ways the quest to find the optimum break crop continues, but for some, the answer will long remain sugar beet.

While in the past the crop may have found itself under scrutiny due to its late harvest which can negatively impact soil health, the industry has progressed, and many growers now take a longer-term view when it comes to managing their soils.

In some cases this has meant adapting their approach to growing sugar beet to not only mitigate sustainability concerns, but to ensure optimum yield output to support on-farm profitability.

To discuss this topic further, *CPM* brings together Norfolk-based farm manager, Toby Hogsbjerg; independent cultivations expert, Philip Wright; and BASF's business development manager and former agronomist, Iain Ford.

Toby manages the Wicken Estate in Castle Acre near Swaffham – a 950ha soil health-orientated system featuring winter wheat, winter barley, oilseed rape, spring barley, sugar beet, potatoes, spring peas and game cover. The estate's soils range from blow-away sand to sandy clay loam.

Philip was technical director of Simba International before establishing Wright Resolutions – a consultancy business

Cover crop benefits

Having implemented a cover crop regime, grower Toby Hogsbjerg said ground cover is maintained and sugar beet establishment has improved, while the farm has also reduced its cultivation passes.

specialising in agricultural cultivation and establishment machinery.

SUGAR BEET'S VALUE

To open the discussion, Toby shared why he believes sugar beet has become a key component of the Wicken Estate's cropping rotation. "Being in north Norfolk, sugar beet is a standard break crop – we're on light land within 20 miles of the factory.

"But beyond this it's a superb, clean-up crop for us and offers something totally different – from its establishment mid-March before we start planting potatoes, to being able to use different herbicides for weed control.

"Having a ring-fenced farm with fully concrete tracks, pads and areas to put sugar beet on, facilitates harvesting during the winter when conditions are right. We can store the beet well and get them to the factory without creating damage to the farm in the meantime," he explained.

Adding to Toby's endorsement, Philip highlighted sugar beet's role in adding structure to soils. "As a crop, the roots fire and power down to open the soil up; it tends to be harvest and the aftermath from that which causes the damage, not the crop itself. When used as a strategic crop it can achieve great things, so it's a question of trying to minimise the downsides."

According to Philip, ensuring soils are in a resilient state in the first place helps their recovery post a root crop harvest. "Focus on prevention rather than cure."

FOSTERING SOIL HEALTH

Expanding on the topic of soils, Toby revealed that since his appointment at the estate six years ago, he's instigated distinct changes in a bid to overcome the 'new normal' weather conditions.

"The biggest issue we've experienced during that time is the 900mm of rain which has fallen during autumn in five out of those six years. That's incurred some monumental damage when lifting potatoes or sugar beet, purely due to the quantity of rain.

"As such, we've adopted a fairly strict regime where the beet area is cover cropped in July straight after barley, that's then grazed by sheep before being destroyed in January," he continued. "Turkey litter is applied, followed by a min-till light cultivation with a Sumo Trio. Then we use a cultivator to knock the headlands down, tidy up and make a seedbed. If it's heavier land, we'll direct drill straight into the Sumo if we can."

With this approach, Toby said ground cover is maintained and sugar beet establishment has improved, while the farm has also reduced its cultivation passes. "That said, some fields have to be ploughed as we're on light land which doesn't restructure itself – the plough is a reset. When I joined the estate I didn't want to plough, but I've since realised that it actually makes a big difference."

As for this season's beet crop, Toby shared that he's optimistic, to which Iain responded he believes that's a result of Toby's cover crop-based regime. "It's been so dry at the moment that many sugar beet crops are really struggling. However, those which have been planted into good conditions with some moisture are faring better," commented Iain.

CROP INPUTS

Moving to crop inputs, Toby said he focusses on maintaining green leaf area which he achieves primarily through managing nutrition and application of biostimulants. "It's all about trying to keep leaves healthy and growing for a more resilient crop.

"We also use Revystar XE (fluxapyroxad+ mefentrifluconazole) – an early application and then a second on the later harvested beet – to help with green leaf retention and to keep disease out which is a major debilitation to stressed crops."

Toby then highlighted the fact that sugar beet crops aren't as big as they used to be and this is having an unintended impact. "Targeted breeding has reduced the canopy to make harvesting easier meaning there's a smaller area to protect which still has to do just as big a job.

"With a lot less leaf to propel the motor as such, we really have to look after the crop as we go into the winter."

Iain added that since its authorisation in sugar beet, Revystar XE has ▶

Ground impact

According to independent cultivations expert, Philip Wright, it tends to be harvest and the aftermath which causes damage, not sugar beet itself.

Boosting resilience

BASF has observed that improved plant resilience appears to result from earlier applications of Revystar XE in sugar beet, explained the company's Iain Ford.

continually demonstrated its crop safety. "It's kind on the crop, provides excellent control of all main diseases, and really does help to maintain green leaf area for a much longer period, and that's resulted in better yields."

Trial results from the past two seasons have shown how two sprays of Revystar XE at 1.0 l/ha delivered an increased yield of more than 30 adjusted t/ha compared with untreated plots, and 13t/ha more than two sprays of competitor products

"What we've also observed is that improved plant resilience seems to result from earlier applications, something we particularly saw last season."

With this in mind, Toby commented that despite recent arid conditions, it doesn't take much for disease to take hold. "Being a coastal estate, we can experience sea mist, low cloud or fog until lunchtime meaning you have moist, damp air the whole time around the crop. After that it can be bright sunshine.

"But if you have a large canopy you have ideal conditions for disease so you can't be complacent during dry weather. We had a heavy dew this morning and that alone can be enough in a canopy to start disease, especially in a shaded or low area of a field.

"You have to be aware of the risks; we're running weather stations and disease models to help us to prepare for all eventualities."

Offering protectant activity with longevity of control, Iain believes this is why Revystar XE stands out from other chemistry. "It's a key advantage of Revystar – having it as a first spray is the best starting point because you know it's going to cover all of the bases with regard to disease with long-lasting protection," he said.

POST-HARVEST

Bearing in mind concerns regarding the impact on soils from harvesting sugar beet, Philip highlighted the benefits which can in fact be achieved. "With long-lived crop canopies, the biomass return above and below ground is very beneficial.

"Then it's a case of focusing on getting the next crop in to fire more roots down and quickly mop up what's left, while exploiting what's been achieved with the sugar beet."

He reminded that although the weather can't be controlled, harvest should be avoided if soils are plastic. Equally, drainage is often a neglected factor. "It can be a thankless task repairing ditches in the middle of winter but it's massively important and there's no shortcut for that. It's investing in both your soils and your infrastructure."

For Toby, he said his aim is to turn fields around quickly, drilling straight after the sugar beet harvester. "If conditions are marginal then we'll potentially plough the plot and combi drill one after the other, meaning wheat can establish within 2-3 weeks of the beet coming out.

"We drill everything with a combi drill – cereals after a root crop – so we achieve a nice level finish and good establishment. If we don't achieve this and fields are left until the spring, wheelings fill up with water, the soil is damaged and waterlogged, and compaction really takes its toll on the land."

Iain added that although the group was discussing sugar beet, ensuring all crops in the rotation are both established and harvested in a sustainable way is an integral part of rotation management. "Looking after soils will benefit the current crop, but also the following crops in future years too."

ADDITIONAL THOUGHTS

Philip raised that although he's primarily a cultivations expert, he appreciates the importance of an integrated approach. "It's a chain whereby if one link breaks, the whole system doesn't work which is why attention to detail right from the outset is critical.

"If you can create a resilient crop which is established in the correct conditions, chemistry then comes in and can be supportive rather than being the only last resort," he said.

> *"It's all about trying to keep leaves healthy and growing for a more resilient crop."*

Referring back to Revystar XE specifically, Toby pointed out that there's an added benefit when it comes to integrating livestock in the rotation. He shared that where the product had been applied to the growing crop, the sugar beet tops were safe to be grazed at a later date.

Iain confirmed that there are no restrictions on Revystar XE when it comes to livestock grazing providing the harvest interval of 28 days is observed. ●

Beet moth warning issued

After an earlier than expected invasion of aphids into beet crops, spring weather could be creating ideal conditions for beet moth. *CPM* reports from BBRO BeetField25, where experts explained more.

By Mike Abram

The weather patterns in May have instigated concerns that the current season could mirror 2022 due to dry weather creating perfect conditions for beet moth, explained experts at the recent BBRO BeetField25 events.

Favoured by dry, warm weather and an open canopy, the moth caused considerable damage in 2022, said BBRO's head of science, Professor Mark Stevens. "Sadly, everything could be stacking up to favour the moth again," he continued.

He shared that initial monitoring has found three yet-to-be confirmed beet moths at BBRO's Linton site the week prior to the BeetTech25 events, which took place in mid-May. "The problem with this micro-moth is it's very similar to around 60 other species, so it's not easy to identify, especially as the pheromone traps we and colleagues in other countries use seem to attract one or two other similar moths," he noted.

Consequently, a wider network of pheromone traps was due to be set at the 20 BBRO monitoring sites around the beet region by the end of May.

In terms of life cycle, adults from the species, which Mark believes is now established in the UK, lay difficult-to-see eggs in the heart leaves of beet plants initially towards the end of May and into June. These hatch in around two weeks, depending on temperature.

"The small caterpillars then start to mine into the hearts and as a consequence you see blackening of the heart, which can resemble the secondary stage of downy mildew infections or boron deficiency," explained Mark.

He said one way to distinguish between beet moth damage and downy mildew infection is to turn leaves over to see whether there's a fungal purple bloom typical of downy mildew, whereas with beet moth, the black deposits are faeces or frass. "Alternatively, send pictures or samples to the BBRO plant clinic," stressed Mark.

The extent of damage depends on the number of caterpillars, which can become increasingly difficult to find. However, where damage is severe, the affected crown may be killed and lateral ▶

Control measures

According to BBRO's Professor Mark Stevens, early-stage data suggests Cythrin 500 (cypermethrin) – which has a general caterpillar control on its label – has efficacy against beet moth.

Obliterated beet

The extent of damage depends on the number of caterpillars, which can become increasingly difficult to find.

▶ growing points stimulated to produce secondary leaves leading to multi-crowning.

In 2022, it was the second generation which laid eggs in July and August that caused more damage, with secondary rots and early harvesting decreasing yields, highlighted Mark.

While cool, wet weather is the best form of defence against beet moth due to heavy rain usually drowning the caterpillars, BBRO has started to conduct early experiments in its laboratory into the efficacy of various insecticides, he reported.

"It's probably the easiest pest to rear that I've seen in my career, which gives us a rich source of caterpillars to test products against. What's been encouraging from the early-stage data is that the product we have available, Cythrin 500 (cypermethrin) – which has a general caterpillar control on its label – has efficacy."

If required, Mark advises using the maximum available water volume to help with penetration into the leaves and canopy. "But we're also conscious to provide tools which aren't pyrethroid-based because we know 80-90% of aphids are resistant to them, and they also have a consequence on beneficial insects.

"So we're looking at one or two other active ingredients, including diamides, and the early signs are encouraging," he added.

But whether that could lead to more products being available for 2025, possibly through an emergency authorisation, is a developing situation, pointed out Mark.

BeetField25 attendees also heard that the dry spring has contributed to earlier than expected migration of aphids into sugar beet crops, although initially mostly of the potato aphid, *Macrosiphum euphorbiae*, rather than the more typical peach-potato aphid *Myzus persicae*.

Cold weather during January and February has led to mean average temperatures of 4.3°C being used within Rothamsted's model for predicting when aphids would fly into beet crops for Norfolk, explained Mark.

"That's nearly 2.5°C colder than the previous winter and meant we weren't anticipating aphids until 12 May."

However, the weather pattern since the beginning of March meant aphids started arriving in beet crops from around 10 April. "What we've seen through April into early May is one of the largest migrations of *Macrosiphum euphorbiae* that I've seen."

A larger aphid than *Myzus persicae*, the potato aphid is easier to spot, highlighted Mark. "It's probably led to the early insecticide applications controlling this species. There's nothing wrong with that; it's a green, wingless

aphid which is what the threshold is for, and it does transmit virus, albeit not quite as efficiently as *Myzus persicae*, which is perhaps something we should do a little more work on."

Across BBRO's aphid monitoring network of 20 field sites with yellow water pans, which started trapping aphids at the end of April, a total of 10 *Myzus persicae* and 10 *Macrosiphum euphorbiae* were caught, added Dr Suzannah Harder, BBRO applied crop protection scientist.

"If you compare that with last year it was 351 aphids, which, while a little academic, does show the winter weather patterns have done something to suppress overall numbers."

All caught aphids were also tested for whether they carried two of the three viruses that make up the virus yellows complex, she said. "We can test for beet mild yellowing virus (BMYV) and beet chlorosis virus (BChV), but not for beet yellows virus (BYV).

"We think it's because BYV stays on the aphid mouth parts and is washed off when the aphid has a bath in the yellow water trap, whereas BMYV and BChV particles go further into the aphid gut, accumulating within the body and are more protected," explained Suzannah.

At the time of the Morley BeetField25 event, no aphid had been found carrying either of the two viruses that could be detected, she reported. "But remember, we're only trapping a very small percentage of aphids coming into a crop which is why the threshold for treatment doesn't account for whether we find virus in the aphids in the yellow water traps."

Aphid behaviour also makes using the virus level in trapped aphids risky, suggested Mark, as the insects tend to move quickly from plant to plant as they don't like feeding on sugar beet as much as other plants. That makes the insect a very efficient virus spreader which could easily pick up infections from feeding.

Potato aphid

April into early May has seen one of the largest migrations of *Macrosiphum euphorbiae* that Professor Mark Stevens has ever witnessed.

"Make sure you're at the threshold of one wingless green aphid per four plants though before spraying. We only have limited tools available, so it's important to only use them when we're at that point."

Some beneficial insects could easily be confused with aphids, highlighted Mark. "It's happened several times this season already where growers have asked about orange aphids which were actually globular springtails – a beneficial insect – and we don't want to use an insecticide against an insect that isn't consequential for virus infections."

Both Mark and Suzannah suggested the four weeks from mid-May through to mid-June would be crucial for aphid control, with the main *Myzus persicae* migration taking over from the early migration of *Macrosiphum euphorbiae*.

"That is starting to happen," reported Suzannah. "Early catches from this week had more than 20 *Myzus persicae*, while *Macrosiphum* numbers had fallen to just one or two per trap," she concluded. ●

LASTWORD

WITH JANINE ADAMSON

Love thy nature

There's no beating around the ethical bush this month – how people treat animals says a lot about who they are as an individual, don't you think?

Call me soft in the head, admittedly sometimes my brain feels like Play-Doh, but I believe all creatures should be treated with respect and kindness.

A recent incident had me pondering this further – when a neighbour's cat was involved in a fatal road traffic accident and while tending to the poor love, it was suggested by a third party that I throw her into a black sack and let the bin men dispose of her the following day.

Given my neighbour was on holiday at the time it didn't sit comfortably with me to discard her beloved pet in this manner, so a short blessing and sturdy cardboard box it was...I'd work out the next steps later.

The individual who made the albeit practical, yet perhaps rather insensitive suggestion, made it clear I was verging on insanity, in professing I wanted to provide the cat some dignity. But how would I feel if someone I barely knew binned my pet without my knowledge or permission? To be honest, I'd blow a gasket; hell would break loose in sleepy Staffordshire.

But it doesn't have to be domestic for my heart to melt. For example, I can't bring myself to despise a fox, despite having lost plentiful poultry to the predator during the years. RIP Cedric the wellsummer. I can only think it's because foxes belong to the same biological family as dogs – Canidae, plus they are rather mystical.

If I come across a roadkill hedgehog it actually shatters me, as does seeing a fledgling baby bird who hasn't quite made it.

Here's another one – corvids. I'm laughing as I'm typing this, but I adore animals so much that I could find the merits of an old crow if I tried hard enough. There is some logic – my nickname is J (do I look like a Jan?), thus I'm often presented with Jay-related items. As such, I absolutely cannot dislike Corvidae.

Of course there are occasions where I have to draw the line – usually pest-related – and I'm certainly not naïve to the benefits of population control. But on the whole, if we can't exercise the best version of ourselves towards a defenseless animal, well, there's no hope for the human race is there.

Yet you're not a vegan, I hear you cry! Well that's a subject for another time, friends.

Individuals like me don't want to be millionaires, they want scientists to find a way to make dogs live longer; for people to be responsible pet owners and to care for the nature which we're blessed with.

They say being unkind to animals is the gateway to being a serial killer – well that's one thing society does not need more of. ●

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.

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