For farmers and their agronomists

CPM CROP PRODUCTION MAGAZINE

May 2025

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‘It’s a chicken and an egg thing’

POINT OF VIEW

Representing agriculture has never been more important, and credit is due to those who are willing to step forward, speak up for the industry, and engage in the difficult conversations required to shape a sustainable future.

But, agriculture is made up of many sectors each with its own challenges, pressures and opportunities. It’s very easy for some of these to be drowned out by the noise of broader industry issues.

Take the potato sector, for example. It’s driven by passionate individuals who are willing to invest heavily in a high-risk crop which plays a vital role in the UK’s food security and produces a product that’s loved by consumers.

Until 2021, potatoes were represented by AHDB under a statutory levy and while that system was far from perfect—many growers felt it didn’t deliver what they needed – it did provide essential behind-the-scenes work which gave the sector a voice.

When AHDB Potatoes was lost, it created a void. Recognising the importance of what had been lost, a group of forward-thinking growers and stakeholders came together to create something new. In 2022, GB Potatoes was born—a trade organisation with a clear mission to represent the entire potato sector through collaboration, communication, and cooperation.

Building a new organisation from scratch was no small task, but GB Potatoes has already delivered meaningful results on behalf of the industry. The challenge is that much of its work happens behind the scenes, often unnoticed by those who benefit from it.

Thankfully, many businesses and growers do see the bigger picture and have stepped up to support, understanding that this is about the future of the sector, not just their own operations.

When I speak to potential members, I’m regularly asked: ‘so what is in it for me?’. I always answer honestly explaining that it’s for the whole sector not for an individual business, currently.

Sadly, too many remain focused on the immediate interests of their own farm or business, without seeing the risk of a fragmented, voiceless sector.

I sincerely hope that it doesn’t take a crisis in the potato world to make people realise that every sector needs a voice. Luckily, GB Potatoes is laying the groundwork just in case that disaster happens. It really is a chicken and an egg thing.

By Graham Bannister
Graham is a knowledge exchange Leader with 40 years of agricultural experience including roles with AHDB. He’s currently working with GB Potatoes as its development manager.

CPM CROP PRODUCTION MAGAZINE

We investigate the science behind a nitrogen-fixing bacteria which colonises plant cells.

May 2025

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OPINION

AGRONOMY

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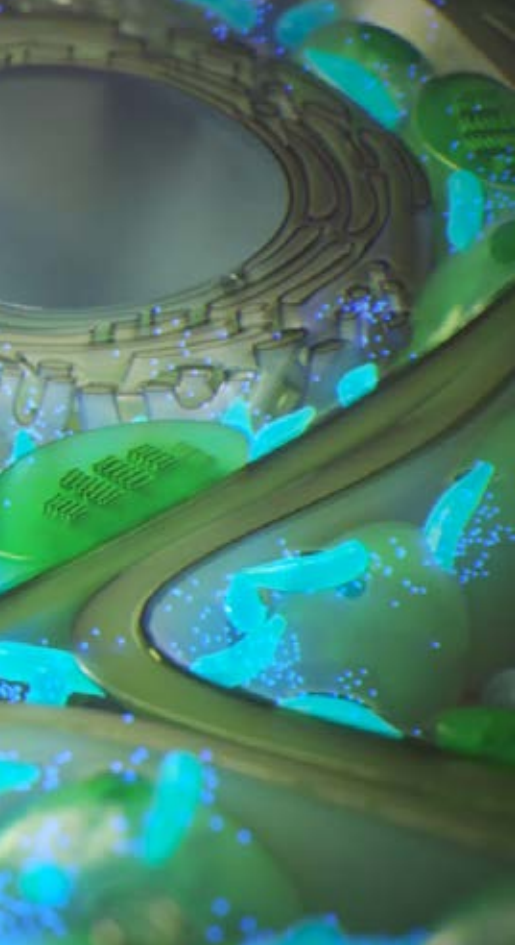

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CPM CROP PRODUCTION MAGAZINE

May 2025
Volume 27 No 4

CPM works with the industry to inspire, stimulate and inform.

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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.

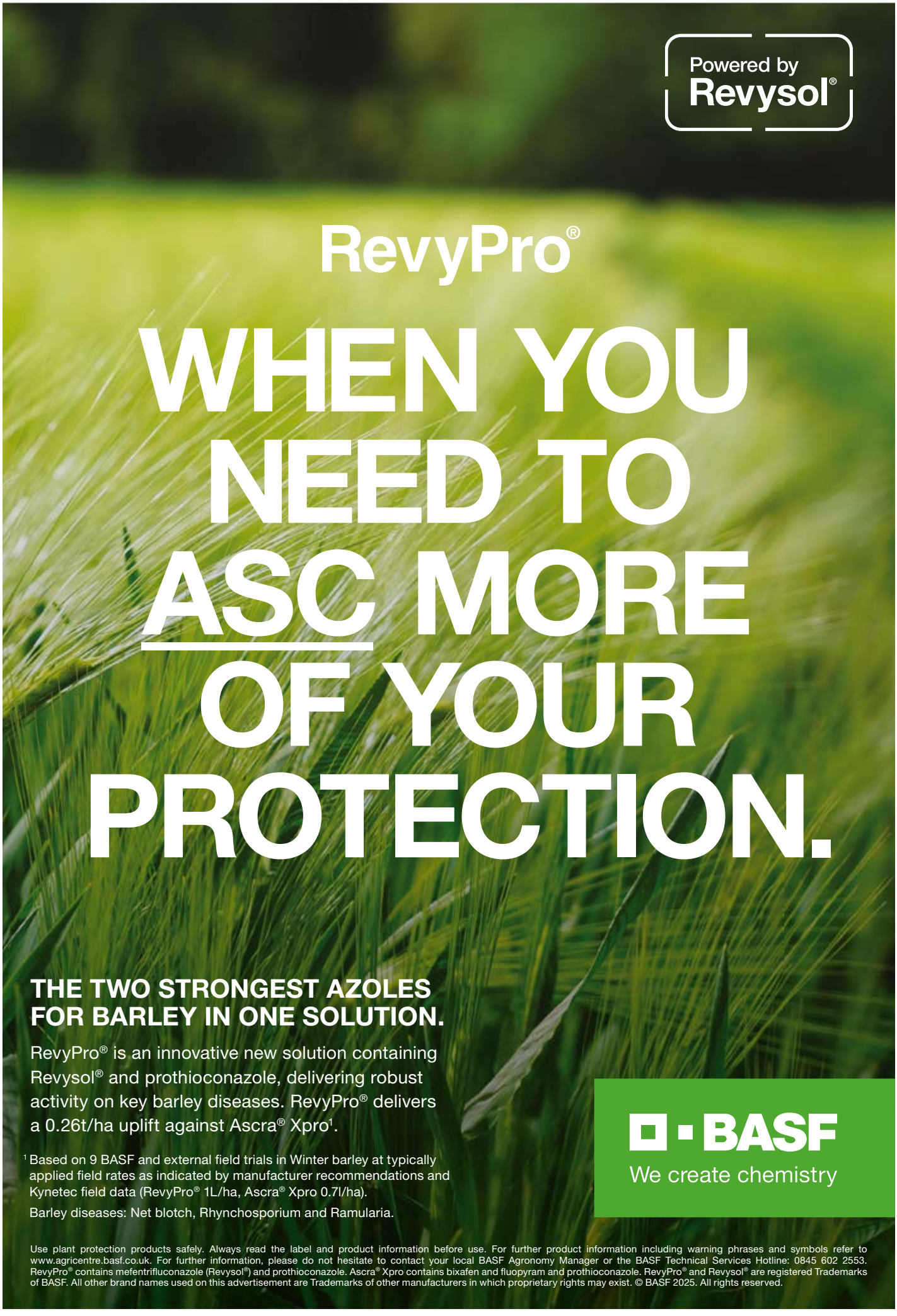
Above all, the magazine is read by UK farm business owners – decision makers. Articles are mostly in-depth and analytical, exploring the issues behind a current problem while aiming to present new ways of thinking.

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.

 CPM (Print) ISSN 2753-9040 CPM (Online) ISSN 2753-9059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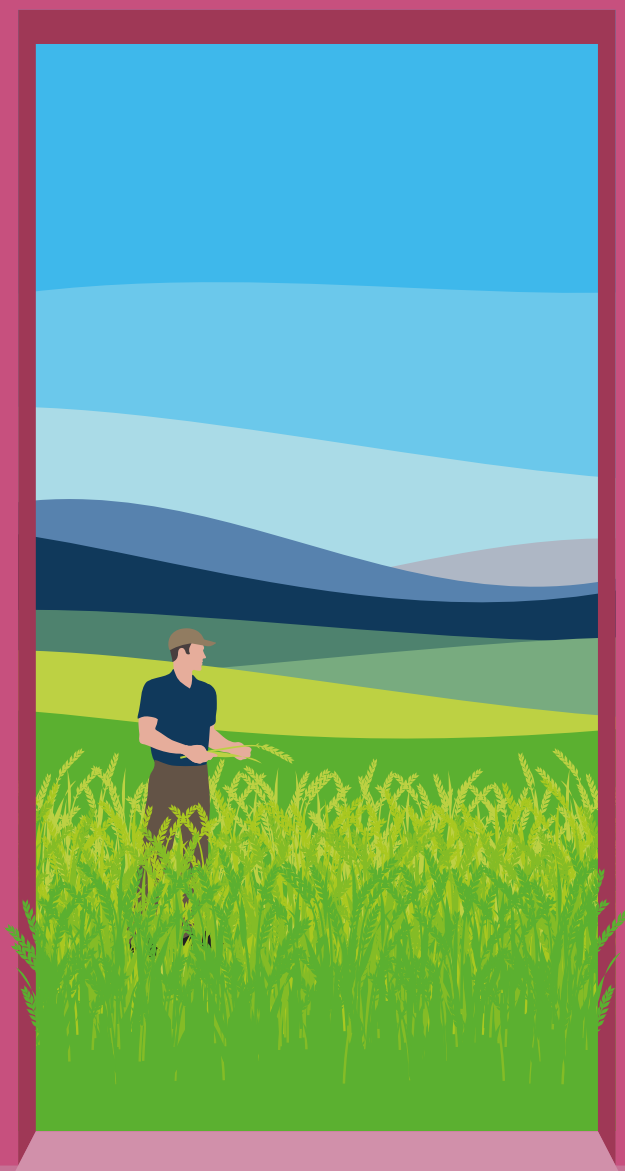

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COVER STORY

"It's not just in the seed; it's likely to be prevalent across the farm."

DAVID LEAPER

Ergot: the problem growers can't afford to ignore

According to experts, the past year has been the worst the UK has ever seen in terms of ergot infection levels, leading to an increase in costly grain rejections and pressure on cleaning services. *CPM* investigates the importance of on-farm management in tackling this fungal pathogen.

By Janine Adamson

Despite having little impact on yield, the presence of ergot has a significant impact on a crop's margin due to grain merchants adopting a zero tolerance approach – primarily because it poses a human health risk through the generation of toxic alkaloids.

And with last year's cool, wet spring facilitating increased sporulation, as well as a prolonged flowering period, more farmers than ever have found themselves grappling with this difficult to manage pathogen and therefore potential costly rejections.

But with no registered plant protection products for its control, what actions can growers take to help mitigate the proliferation of ergot on their farms?

UK Flour Millers' Joe Brennan, who chairs the UK Ergot Working Group, says having a deeper understanding of the pathogen and its behaviour is key in breaking what's become a cross-seasonal chain of infection during the past three years. "Some sites have invested in colour sorting or cleaning technology, and while this is welcomed, screening adds an unwelcome cost and doesn't tackle the cause.

"So rather than becoming reliant on these services, there's a much greater emphasis on rectifying ergot at an on-farm level. Although there's no silver bullet – chemical or cultural – what we do know, is there are a series of factors which collectively can contribute to its reduction."

To rewind a step, ergot is caused by Claviceps purpurea and while considered a seed-based problem, isn't a true seed-borne disease because it infects the open, unfertilised flowers of a range grass hosts.

As explained by AHDB, at or near to harvest, ergots fall to the ground where they remain dormant until germination the following spring. Airborne spores are then spread to nearby open flowers which germinate and infect the ovaries.

This infection leads to the production of secondary spores encased in a sticky 'honeydew', attracting insects which carry the spores to other flowers where further infection can occur. The fungus then grows in place ▶

New management practices

According to Agrii's David Leaper, while the effective control of ergot relies wholly on cultural methods, these are slowly being eroded by changes in farm management practices.

of the grain to form hard, purple-black sclerotium, known as an ergot.

Ergots can be very large up to 2cm in length, and are either harvested with the grain or fall to the ground where they remain as a source of inoculum for the following year.

To add a further layer of complexity, the same isolates of Claviceps purpurea can infect both cereal and wild grass species, although the subsequent sclerotia present slightly differently – grassweed ergots being smaller than their cereal counterparts.

According to Agrii's David Leaper, while the effective control of ergot relies wholly on cultural methods, these are slowly being eroded by changes in farm management practices.

"Historically, ploughing was the main way to reduce the disease through burying the ergot fragments, but in recent times, there's been a shift towards min- or no-till. Equally, we're increasing the chance of secondary hosts with the likes of environmental field margins and through the proliferation of grassweeds.

"Whereas for seed-borne loose smut we can target it directly through the application of seed treatments, ergot has such a range of hosts that it's become endemic," he stresses.

David points out that although it's highly frustrating to have ergot-contaminated seed, the problem will be much wider than first meets the eye. "It's not just in the seed; it's likely to be prevalent across the farm. So in those cases, it's learning how to live with ergot through understanding which control measures are most effective on an individual field-by-field basis."

In-field source

Ergots can be very large, up to 2cm in length, and are either harvested with the grain or fall to the ground where they remain as a source of inoculum for the following year.

Eradicating alkaloids

Why it's critical to avoid relying on colour sorting to fix the ergot problem

Ergots contain large amounts of mycotoxins (ergot alkaloids), therefore highly contaminated grain can pose a risk to both animal and human health. Furthermore, as of 1 January 2022, the EU reduced ergot sclerotia limits from 0.05% to 0.02% in unprocessed grain, highlights UK Flour Millers' Joe Brennan.

"It also established maximum levels for ergot alkaloids in processed cereal products such as flour. Although this applies to the EU and NI, many GB customers sell flour or flour-based products into this marketplace, so it affects a significant proportion of food cereal demand."

He says it's very difficult to control ergot alkaloids in grain relative to the very low legal limits in processed cereal products. "So there's a mis-match between the ergot sclerotia limit in wheat and the ergot alkaloid limit in processed cereal products.

"A study found if milling wheat containing ergot sclerotia at the EU/NI legal limit of 0.02% results in white flour with ergot alkaloids of around 350parts/Bn, this is well above the legal limit of 100parts/Bn. The EU regulations don't actually make sense.

"This is why many mills have stricter limits for ergot sclerotia in grain with some having a zero tolerance, which reaffirms the importance of vigilance."

Perhaps concerningly, although removing sclerotia from grain reduces the ergot alkaloid content, this isn't always to zero, as demonstrated through AHDB-funded research by Niab.

The work suggests this is due to various reasons, for one, through the transfer of dust or residue to the grain. "Equally, when you disturb infected grain, this can cause the sclerotia to fragment, making it more difficult to clean. Plus, the efficacy of colour sorting for small ergot pieces and grassweed ergot isn't currently clear," continues Joe.

Secondly, ergot infections have also been proven to lead to ergot alkaloids in 'healthy' grain above and below the infection site, as indicated by Niab's research.

"Both of these forms are effectively invisible to a mill intake and rapid testing for alkaloids isn't currently available. This should prove a strong incentive to tackle ergot at the point of infection to avoid background levels of alkaloids," concludes Joe.

Background alkaloids

UK Flour Millers' Joe Brennan says with invisible forms of sclerotia, and no rapid testing for alkaloids available, this should prove an incentive to tackle ergot at the point of infection.

As well as affecting rye, triticale, wheat, barley and oats, ergot also infects a range of grasses, particularly favouring blackgrass. Key to its development are cool, wet conditions during flowering, while Joe says uneven crops or late/secondary tillering can also make infection more likely.

"This season, reports from our members suggest it's often grassweed ergots that are being picked up, which are smaller and break up easily, making them harder to screen out," he adds.

"There's an emerging friction where farmers are being encouraged to engage with environmental schemes and adopt sustainable approaches, yet this could be contributing to the risk of ergot. The scientific literature suggests this could be the case, exacerbated further by environmental conditions."

He also suggests that with rotations being constricted due to limited break crop options, repeated cereals are another way of creating a chain of infection. "Although anecdotal, our data suggests that levels of grain rejections due to ergot have increased as the hectarage of oilseed rape has declined.

"Remember it isn't just wheat, ergot

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On-farm ergot control

Steps growers can take to minimise the spread of ergot and hopefully reduce its pressure

Collaborative research undertaken with Arvalis research institute in France suggests there are four key on-farm control measures for ergot, shared Niab's Dr Lesley Boyd during a UKCVPS stakeholder workshop earlier this year.

She says the primary tactic is to deploy an effective year-round weed control strategy, particularly aimed at ryegrass and blackgrass management.

Then, research has shown that inoculum in the field can be controlled by deep tillage to bury ergots after harvest. However, she stresses this must be followed by shallow tillage the following year to avoid bringing ergots back to the surface. This is because the work with Arvalis suggests sclerotia can remain viable for up to five years.

Growers should avoid growing straw-cereals for at least two years and thus make adaptations to the rotation accordingly.

Finally, Lesley says ergot-infected areas within a field should be harvested separately and not added to the bulk of the harvested crop to contain the infection.

Seed treatment option

UPL's Tom Wheelhouse reminds that while Rancona iMix doesn't eradicate ergot outright, its label claim does include a 'suppression of the germination of ergot particles'.

can even be found in oats, although this is usually grassweed ergot. Either way, ergot loves a seasonal chain and being carried through."

David adds that by their nature, varieties with open flowering habits are more susceptible, including most spring wheats. He's also noted a geographical ergot 'hot-spot' band. "If you map it out, there appears to be an increase in prevalence right across the Midlands.

"This could be due to a range of factors, but it does make sense given land is often heavier, lending itself to greater blackgrass pressure and reduced ploughing. We also see an increase in milling wheat across the region, and wheat is the crop we screen the most through Agrii's mobile seed cleaning provision."

While it isn't necessarily an option to revert straight back to ploughing, David believes shallow cultivations to around 50mm deep can still help because ergots have a short-term viability of just one year. "I'd certainly advise avoiding second wheats if there's been a historical ergot problem, as well as considering a move to spring cropping to get grassweeds back under control."

He also reminds of the role of seed treatments such as Redigo Pro (prothioconazole+ tebuconazole), Beret Gold (fludioxynil) and Rancona iMix (ipconazole+ imazalil), as DMI chemistry can offer a level of suppression of fruiting bodies within the soil.

According to UPL's Tom Wheelhouse, while Rancona iMix doesn't eradicate ergot outright, its label claim does include a 'suppression of the germination of ergot particles'. "Previous work indicates this can reduce the incidence of ergot by 40-60%; UPL has instigated a new study at its Shray Hill research station near Shrewsbury to investigate this further and expand our datasets.

"This is in direct response to the increasing prevalence of ergot – it hasn't been such a big issue until now," he says.

Tom comments that he believes the use of untreated farm-saved seed may also be contributing to the problem. "With a range of seed-borne diseases as well as the threat of ergot, opting for a seed treatment is a very direct way to target a pathogen."

> ***"Although anecdotal, our data suggests that levels of grain rejections due to ergot have increased as the hectarage of oilseed rape has declined."***

St Neots-based farm manager, Ian Lutey, says ergot is something R H Topham and Sons has had to learn to live with for a number of years, having had crops rejected in the past. "We try and keep ahead of the game, but can find ergots in wheat, spring barley and spring oats can often be covered in it. Some farmers say they don't have it, but if you look hard enough, it's there."

According to Ian, the problem tends to reside more on the headlands, whereas he believes the cutting restrictions of stewardship schemes can often exacerbate the problem.

In a bid to combat overall disease pressure, he says the farm stopped growing milling wheats, focussing on soft and hard feed wheats. As for ergot specifically, he segregates affected crops at harvest and has these screened through a colour separator.

"Up to 30% of our tonnage might require processing in a bad year. I know ploughing can have some effect, but this isn't always an appropriate option."

As the farm saves a lot of its own seed, Ian says this means avoiding using seed crops which have had an ergot contamination. "If we have no other choice I'll use them along with a fungicide seed treatment, but I accept that it might not completely control it.

"All-in-all, ergot is another economic cost that we have to carry; it's all very frustrating," he adds.

If growers do suspect an ergot-related problem and believe they'll require seed cleaning, David urges thinking ahead. "With the boom in ergot this past year we've found there can be a wait for the service which of course will have an impact on subsequent grain marketing options.

"If you're in a high-risk area or on a farm with a historical problem, book your colour sorting early as it's impossible to service everyone at once."

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Unexpected observations in yellow rust

Has there been a shift in the UK winter wheat yellow rust population? Recent Recommended List trial inspections in the North suggest there could have been. *CPM* speaks to the experts for their thoughts.

By Janine Adamson

As shared by AHDB at the beginning of April, signs of yellow rust have been identified on almost all Recommended List varieties classed as resistant at the young plant stage during trial inspections in the north of England, including some popular varieties.

AHDB says there are also initial hints of 'something unusual' starting to happen in other RL trial regions too.

Although the yellow rust pathogen population is diverse, past experience shows it's not unexpected to detect new strains. However what's concerning, says AHDB's Mark Bollebakker, is these early observations suggest there may be a significant new strain, or strains, in the UK pathogen population which haven't been seen before.

Equally, some varieties historically classified as susceptible at juvenile plant stage are currently relatively clean at the impacted trial sites. Again, this indicates a potential pathogen population shift which may have displaced some other yellow rust strains, adds Mark.

"The trials in question were at GS30 at the time of inspection, so adult plant resistance hadn't kicked in. When it does – from stem extension onwards – these varieties may outgrow initial infection. However, it's difficult to predict what will happen."

AHDB has since sent samples to UKCPVS for testing to provide a better understanding of what's being observed. In the meantime, Mark suggests farmers and agronomists inspect all varieties before final spray decisions and shouldn't rely on the RL ratings until more is understood.

Agrii's seed technical manager, John Miles, raises that historically speaking, it's typical to see around 3-5 suspected incidences of varietal resistance being overcome each year. However, when these are investigated further, they often don't transpire to anything. "It might be due to human error at drilling, for example, or a mix up with seed.

"But this year the numbers have continued to climb with the problem spreading further south as a gradual burn," he explains. "It appears to be something different altogether, and due to it originating in the North, it'd indeed suggest a new race has been blown or carried in."

According to John, this shouldn't really be surprising. "Mother Nature has cooked up something new – it was always going to happen, it was just a question of when. The best case scenario will be it's only the juvenile plant resistance mechanism which has been overcome.

"On the other hand, this could continue to build and have a significant impact. We have to wait and see; if we do lose that resistance mechanism which in many ways we've become reliant on, it'd be a shame," he says. "Equally, it's positive that so far it hasn't built up quickly. If those varieties now take a bit of yellow rust, that's a problem we can handle."

Hutchinsons' head of integrated crop management, David Howard, says agronomists in his teams are noting similar observations. "It's not yet at a significant

Managing yellow rust

According to Hutchinsons' David Howard, this season seems to be rust-heavy, but hopefully that means its management is already front of mind for many growers.

A spring laden with challenges

This spring is turning out to be anything but typical, suggests Niab

At several UK trial sites in the North-East of England, the Niab Northern trials team, led by Hayley Rhodes, has spotted unusually high levels of yellow rust on wheat varieties that are officially rated 8 or 9 for adult plant resistance.

Head of plant pathology, Dr Kostya Kanyuka, says the UK Cereal Pathogen Virulence Survey (UKCPVS) has also already received a surge of yellow rust samples from affected varieties. The team is now working to determine whether this is the result of a new incursion of yellow rust from outside the UK, or whether it's a locally-evolved race which has overcome previously effective resistance genes.

In general, when a wheat variety is resistant at both the seedling and adult plant stages, that resistance is typically due to what's known as 'all-stage resistance' (ASR) genes, explains Kostya.

"If what we're seeing now is the breakdown of a specific ASR gene, such as Yr15, it's possible that adult plant resistance may also be lost.

"However, we can't rule out the possibility that some of these varieties also carry additional adult plant resistance (APR) genes which could still kick in. Because breeders don't routinely publish the genetic makeup of their varieties, it's difficult to know for sure."

Kostya points out that while it's unclear how things will play out, there's still reason to be optimistic. "With any luck, breeders will have stacked both ASR and APR genes into these varieties to provide more robust and lasting protection.

"The good news is that for now, this race still appears to be controlled by tebuconazole when used as an eradicant. However, the virulence of this new race, particularly the speed at which it produces successive spore generations, remains uncertain."

He advises that as a precaution, T1 and T2 spray programmes should aim to include both eradicant and protectant properties to safeguard the canopy. Additionally, intervals between applications shouldn't exceed the recommended 3-4 weeks to ensure maximum efficacy.

Unpredictability

Because breeders don't routinely publish the genetic makeup of their varieties, it's difficult to predict what will happen, says Niab's Dr Kostya Kanyuka.

scale, but we're certainly receiving more questions regarding unexpected varieties such as LG Typhoon and Champion (DSV), and less so for those which you'd assume to be susceptible like KWS Zyatt."

He adds that in terms of crop management, this could have implications on planned fungicide programmes and therefore adaptations may have to be made. "This season seems to be rust-heavy and we know it's a disease which cycles quickly, but hopefully this means rust management is already front of mind for many growers.

"Although we've experienced cold weather during the winter and early spring, I don't believe it'll have been enough to fully knock the disease out of crops. Instead, cooler conditions will have extended the latency of yellow rust, therefore it could be in plants but not visible yet."

David explains that even though conditions have been dry for some time (at the time of writing, mid-April), with heavy dews and crops rubbing together, risk remains high. "Don't assume there's no pressure, it's certainly better to err on the side of caution.

"Equally, despite not observing the same levels of early brown rust as we saw last season, this disease still has the potential to explode later on."

John reminds that although this potential shift in yellow rust pathogen population is undoubtedly interesting news for the industry, it remains a relatively easy disease to control with available chemistry. "With cost-effective options, namely tebuconazole, growers and agronomists should be able to successfully fight the pressure. We've seen this in the field, as growers continue to achieve success despite opting for what we'd deem 'rusty' varieties.

"Looking more broadly at disease, with brown rust becoming more prevalent, yellow rust is behind both that and septoria in terms of how challenging it is to control," he comments.

But what do the breeders have to say on the matter? Limagrain's Ron Granger reveals the firm's plant pathologists and breeders are monitoring the situation closely. "As we're currently uncertain how this will develop from the juvenile to the adult plant stage, vigilance is key to assess crops if early signs of rust do appear.

"What we do know is the levels of disease are unlikely to be uniform across all of these varieties, as those with more complex combinations of background resistance will likely show less symptoms."

As recommended by AHDB, Ron concludes it's important to observe all crops and seek advice from an agronomist regarding any adjustments to fungicide rates or timings. ●

Not all bad news

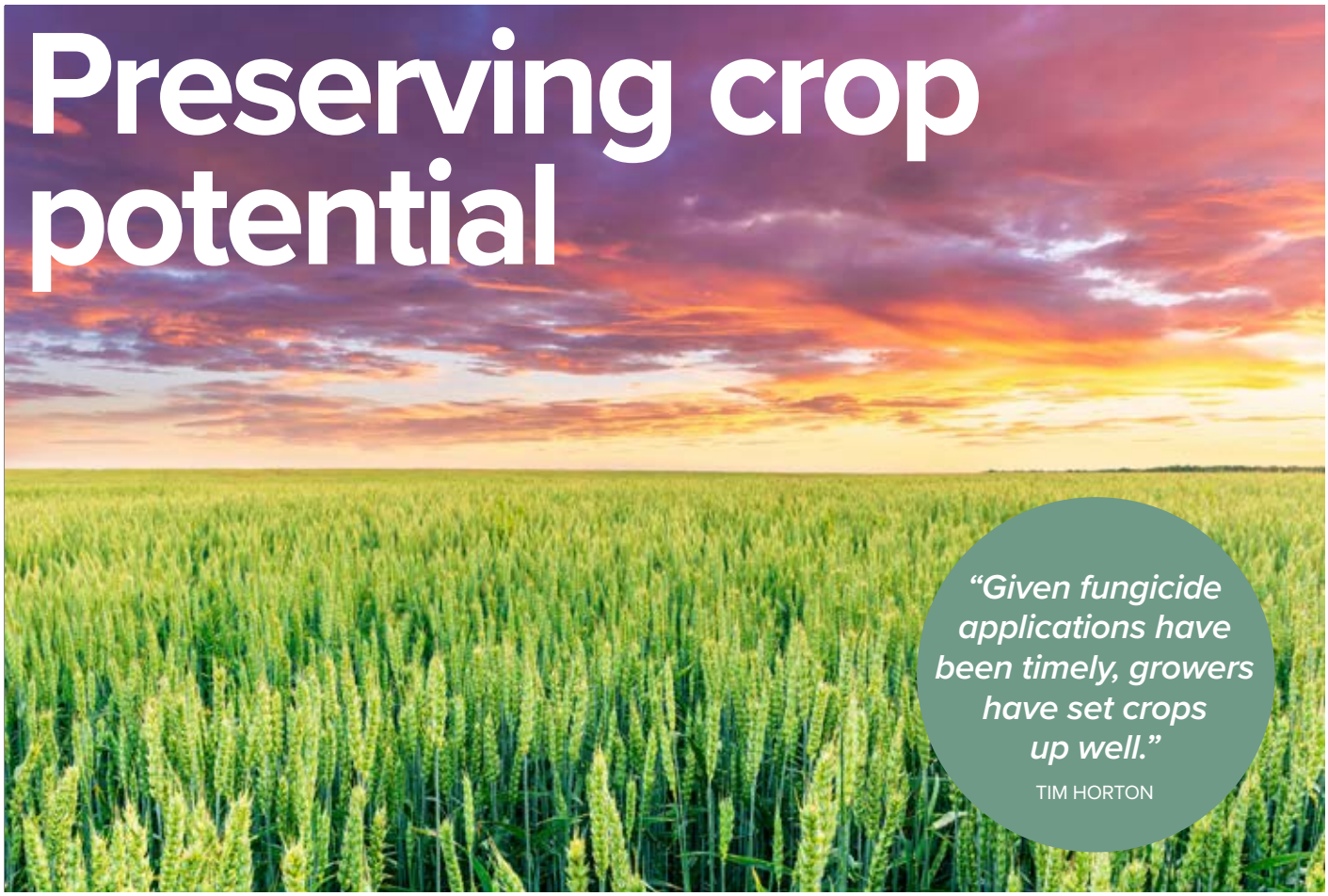
Agrii's John Miles reminds that although the potential shift in yellow rust pathogen population is undoubtedly interesting news for the industry, it remains a relatively easy disease to control with available chemistry.

Varieties with juvenile yellow rust resistance

The following AHDB Recommended List-featured varieties are classed as having young plant resistance to yellow rust:

- **SY Cheer**
- **KWS Newbie**
- **KWS Ultimatum**
- **KWS Palladium**
- **Mayflower (Elsoms)**
- **Blackstone (Elsoms)**
- **Champion (DSV)**
- **LG Beowulf**
- **Oxford (DSV)**
- **KWS Dawsum**
- **KWS Cranium**
- **LG Typhoon**
- **Costello (Senova)**

Preserving crop potential



While the kinder spring has been a blessing in many cases, autumn-sown crops aren't home and dry just yet. With cereals showing promise, preserving their potential is now the name of the game. *CPM* explores some of the priorities.

By Janine Adamson

Despite the dry spring being much-welcomed on the whole, as the old adage goes: too much of a good thing...but aside from a little moisture being on wish-lists, what else could be in demand as the season progresses?

Agrii's Tim Horton says following a reasonably poor autumn, crops have enjoyed the spring sunshine and therefore been able to improve their rooting capacity. "It's certainly looking more hopeful now than the past few years, providing there's a little rain where required, situations appear in control."

But with the current heatwave (end of April), his main concern is brown rust, particularly if temperatures continue to soar. "However, given fungicide applications have been timely, growers have set crops up well so it should be a case of maintaining that," he adds.

Something which he hadn't anticipated seeing this year in such abundance, is gout fly. "Although it's a pest we observe most seasons, levels in autumn crops were much higher this year, exerting greater damage.

"And while crops are now bouncing back, no doubt helped by the kinder spring, it highlights the dangers associated with earlier drilling – something growers may have risked to ensure they had a crop in the ground before the weather turned."

As is widely acknowledged, there's little that can be done for this season's autumn-sown crops, but Tim reminds there remains hope for spring wheats. "As the next generation evolves, this is the riskiest time for spring wheat. A well-timed pyrethroid spray can provide reasonable control, but timing is critical.

"As soon as you can see eggs on the leaf, they must be targeted within seven days," he stresses.

While Tim is optimistic, Somerset-based agronomist Peter Waltham says for his region, it's been another tough season, and as such, there's much crop variability.

"Following Harvest 2024, all hopes were pinned on rectifying the poor,

All under control

Agrii's Tim Horton says crops are currently looking more hopeful than during the past few years, and providing there's a little rain where required, situations appear in control.

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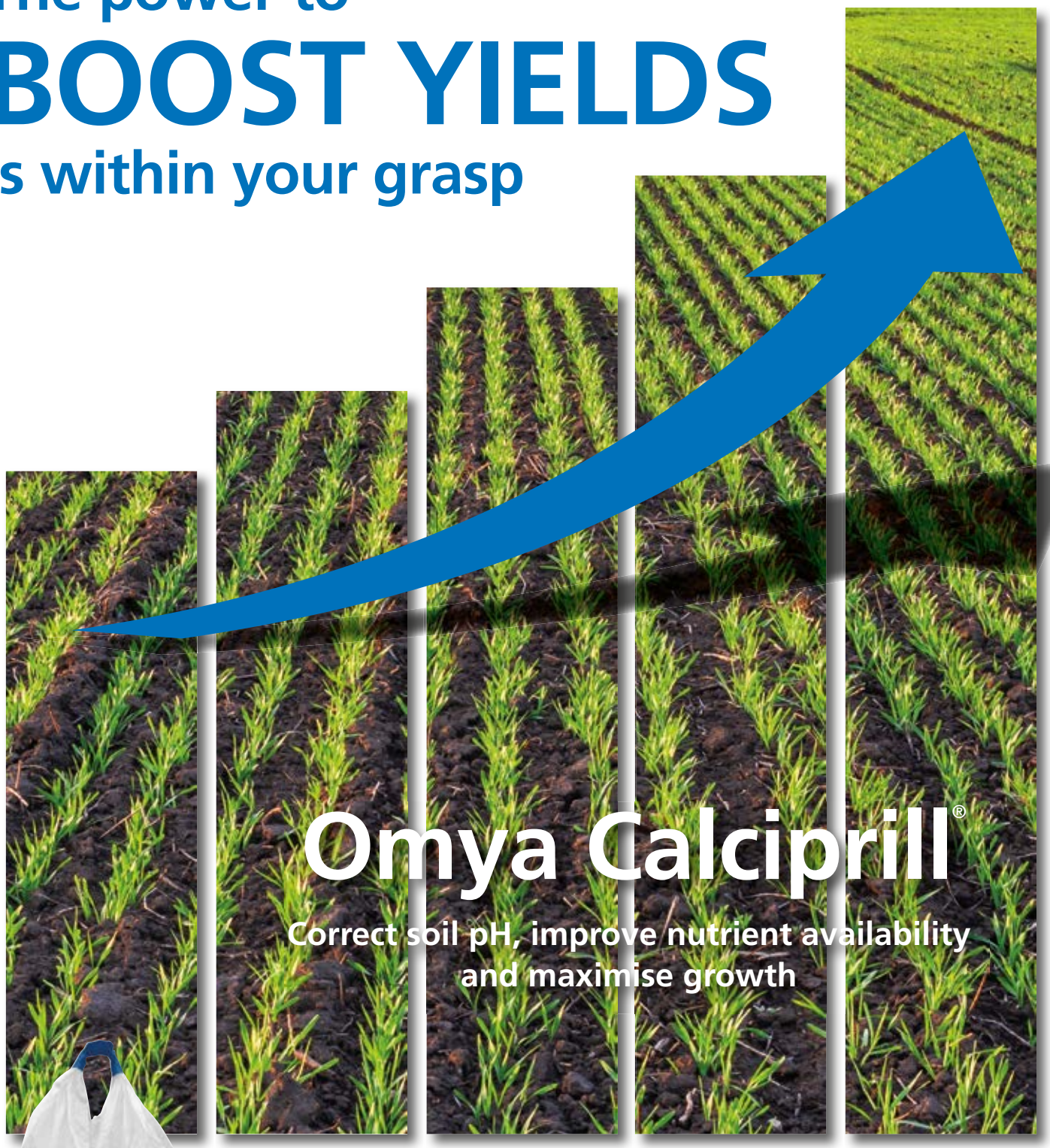

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THINKING OF TOMORROW

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Stepping up disease control

Trials suggest the formulation behind RevyPro is enabling an enhanced performance for the product's two actives, offering growers more than the sum of its parts

Unexpected results
Although the RevyPro trial results were unexpected given his initial scepticism, Velcourt's Nick Anderson (L) says the data will help to inform Velcourt's strategy moving forward. Pictured with BASF's Jared Bonner.

Independent trials indicate using RevyPro (Revysol+ prothioconazole) at T2 in wheat not only offers complimentary benefits, but could also achieve another level of disease control through boosting other fungicide actives in a tank mix.

In fact the work, conducted by Velcourt across multiple sites and years, consistently suggests this is the case, states the firm's technical director, Nick Anderson. "Having first trialled Revypro in 2023, despite achieving positive results, I was a little unsure of its benefits and where it might fit within a fungicide programme," he explains.

"So we wanted to know whether there was a firm advantage to be had from the RevyPro formulation compared with the other Revysol-containing products – Revystar XE (Revysol+ fluxapyroxad) and Myresa (Revysol)."

The trials took place across four sites with two protocols – evaluating the performance of RevyPro at T2 compared with other market-leading fungicide products aimed at this timing, plus the outcome of different tank mix combinations.

> *"In a situation with a range of good fungicide actives to choose from, understanding how best to fit these together is where growers can gain an advantage."*

The trials focussed on septoria activity – the rest of the programme (T1 and T3) was the same across treatments and was designed to deliver good rust activity, but limited septoria control. There were also fully untreated and untreated at T2 plots for use as controls.

According to Nick, the results were conclusive across both protocols. "The trial indicates that a lower loading of Revysol applied as RevyPro at 1.5 l/ha (75g Revysol+ 150g prothioconazole) performs just as well as a higher loading of the active applied as Revystar at 1.0 l/ha (100g Revysol+ 47.5g fluxapyroxad), indicating a formulation benefit with RevyPro."

Critically, the second protocol explored the role of RevyPro as a tank mix partner, which Nick says is where he believes its strength truly lies. "In particular, this looked at different actives to use alongside pydiflumetofen/Adepidyn and fenpicoxamid/Inatreq – which are currently perceived as an industry standard for T2 .

"RevyPro mixtures with Inatreq or with Adepidyn outperformed the other combinations of actives in the trial (fenpicoxamid, isoflucypram and straight Revysol), including combinations of Adepidyn and Inatreq. Adepidyn+ RevyPro and Inatreq+ RevyPro mixtures delivered the highest yield responses in the trials.

"Equally in various scenarios, RevyPro with its lower loading of Revysol, is out-performing Myresa (straight Revysol) at a higher rate."

Although the results have proven unexpected given his initial scepticism, Nick says the data will help to inform Velcourt's strategy moving forward. "In a situation where we have a range of good quality fungicide actives to choose from, understanding how best to fit these together is where growers can gain an advantage.

"A simple one-can solution from a single manufacturer isn't going to cut it, likewise, the most effective partner for the strongest performing active isn't necessarily the second best, as this work indicates."

But what's behind RevyPro's now proven track record? BASF's Jared Bonner explains that aside from containing Revysol which has become a highly important azole, its performance is down to its unique formulation. "This is giving exceptional leaf and ear coverage, with rapid uptake getting both the Revysol and prothioconazole components into the leaf faster than other prothioconazole products.

"This ensures better protection from wash-off and UV degradation, while enabling quicker activation of prothioconazole for enhanced disease activity."

He agrees that combining RevyPro with alternative modes of action within a tank mix offers a robust approach for tackling septoria and rusts, as well as supporting best practice in resistance management. "It's important to note that RevyPro must be mixed with another mode of action when targeting septoria.

"Beyond wheat, RevyPro can also be used in winter and spring barley, offering an excellent fit by controlling of all major diseases: net blotch, rhynchosporium, rust and ramularia."

anaerobic soil conditions through remedial work. Unfortunately, with yet more brutal weather, there were limited opportunities to do so.

"So crops have been stressed – as exhibited through poor vigour – and there's also been some herbicide damage due to the big autumn tank mix stacks used to get back on top of burgeoning grassweed pressure. These are the main factors behind the variability."

Peter, who advises for Agrovista, has been encouraging growers to join him during field walking to provide the evidence behind his decision making. "Commodity prices are appalling to be honest, it makes it really difficult to weigh up and decide what can be realistically spent on a crop even when there is potential."

He adds that he's already encouraging growers to consider their cultivation plans for post-Harvest 2025. "We have to get some air into soils to repair the damage from repeatedly tough conditions. Therefore, now is also a great opportunity to identify poorer performing areas of fields while there's a growing crop, in readiness for later. This also includes remedial work for drainage."

Role of the T3

The target of a T3 is two-fold: it either provides a top-up for disease control particularly brown rust, or, is to target fusarium, explains Sumitomo Chemical's Ruth Stanley.

With his location in the West, Peter is anticipating an explosion of septoria at some point. "Despite its slow start this season, septoria isn't what it was years ago – it's evolved genetically, is virulent and very difficult to control.

"This makes fungicide choice tricky – it's critical to select the right actives, the right timings and the right doses."

Sumitomo Chemical's Ruth Stanley believes this could involve re-thinking the approach to a T3. "While T1 and T2 often receive the most attention, the target of a T3 is two-fold. It either provides a top-up for disease control, particularly brown rust, or, is to target fusarium; the overall purpose being to preserve a crop's potential," she says.

Depending on the required end-goal, this has an implication on spray timing, adds Ruth. "An earlier application during flowering (GS59) is the best position for additional brown rust activity, whereas going slightly later (GS63-65) will offer fusarium control.

"Used alongside the characteristics of an individual variety, this means anticipated spray timings might have to be tweaked," she advises.

A product she suggests could be used in the T3 slot is Sakura/Soleil (tebuconazole+ bromuconazole) because it offers the 'best of both worlds' whether that's targeting brown rust or fusarium.

"Equally, bromuconazole is an active which isn't used so much at the moment. It offers a slightly different option in a programme and so helps to contribute to anti-resistance strategies.

"But at either T3 timing, it'll protect the canopy and ear, mitigate stress and avoid bleaching, seeing the crop through until harvest," she concludes.

Time to see the Crop Doctor

With minds on T2s, most crops look reasonably clean and strong but a disease explosion is only a rain shower away, warn experts

Consecutive weeks of mild and dry spring weather have eased the disease pressure facing crops, which could leave some growers pondering how to approach their T2s. However, the variable nature of some crops and often regional nature of disease pressure means there's no 'one-fits-all' answer, explains ADAS' Jonathan Blake.

Having viewed the variety plots at Bayer's Crop Doctor site at Walpole St Peter, west of King's Lynn, Jonathan says it's difficult to share a general message. "Some days favour brown rust sporulation, others yellow rust, while it'd be unwise to not consider septoria at T2, even in crops which appear clean.

"Yellow rust appears more prevalent here than septoria at the moment, but septoria has a long latent period of around 21 days. So while many crops appear clean, they're still to see the effects of the rain which fell the week before Easter," he adds.

Looking through the varieties, it's possible to find examples of all the main foliar diseases – septoria, leaf blotch, yellow rust and brown rust – just not all in the same variety, says Jonathan. With this in mind, he comments regarding T2s.

"In most cases, it's likely to be a protectant rather than a curative situation which simplifies decision making. Any of the main foliar threats could quickly take hold if conditions favour, so the starting point is to base treatments around active substances with good activity on septoria.

"This could be SDHIs, azoles or QiIs, such as isoflucypram, mefentrifluconazole, pydiflumetofen or fenpicoxamid," he suggests.

To understand the protectant performance of fungicides, Jonathan highlights the value of AHDB's fungicide performance curves. "The AHDB performance data gives a clear representation of a fungicide's activity against each of the main foliar threats," he says.

"Some of these may be broader than others in terms of their spectrum, which may simplify T2 applications by reducing the need to add other chemistry."

Crop Doctor East
Having viewed the variety plots at Bayer's Crop Doctor site at Walpole St Peter, ADAS' Jonathan Blake says it's difficult to share a general message regarding disease pressure.

A yellow light at the end of the break crop tunnel?

Although the UK's oilseed rape area is at an all-time low, this year's crop appears to want to prove the naysayers wrong. *CPM* speaks to those who still believe in its potential to see if it's worth keeping the faith.

By Janine Adamson and Rob Jones

With the weather gods offering much improved conditions compared with last spring, plus a suspiciously quiet population of cabbage stem flea beetle, Premium Crops' Nigel Padbury says he's quite optimistic regarding this year's oilseed rape crop, touch wood.

However, he adds he's under no illusion that this won't necessarily mean growers will come flooding back to the yellow break crop in droves.

"Farmers are even more risk averse than usual at the moment, so despite OSR's positive performance so far this season, I think it'll take more to instill some confidence. We have to be realistic," says Nigel.

He suggests a range of factors seem to have worked in the crop's favour – from improved conditions at planting to reduced CSFB pressure – although feathered friends have caused some growers mischief. "We've seen a lot more pigeon damage this time, but that's likely because there's much less OSR seed to eat in the first place."

With the UK OSR area at an all-time low, he points out that for those with some skin still in the game, they could be rewarded accordingly. "As we head into autumn decision-

Glass half full

Premium Crops' Nigel Padbury says he's quite optimistic regarding this year's oilseed rape crop.

Bucking the trend

Robert (L) and Peter Nickols (R) say they're one of the only businesses in their area still growing oilseed rape.

making, because specialist oil suppliers are anxious about supply we're seeing some appealing premiums coming to the market.

"For example, high oleic acid (HOLL) varieties could achieve bonuses totalling to more than £200/ha compared with a standard '00' crop, for Harvest 2026. Even more appealing, a high erucic acid (HEAR) contract could deliver a lofty £450/ha premium over '00'.

"This means even if yield at harvest lands up being relatively mediocre, growers are better off due to cashing in the premium," highlights Nigel. "Perhaps some food for thought."

Hutchinsons' head of integrated crop management, David Howard, agrees that OSR remains centred around risk management. "Even so, you'd hope this year might encourage some to reconsider growing it," he says.

From an on-farm perspective, he explains that other than where there's been pigeon damage, crops are looking great. "OSR crops which have seen bird damage are variable which will have an impact on flowering. Alongside potential weather events, this could mean a prolonged flowering period which will be challenging for timing sclerotinia sprays.

"The decision to grow it next year will have to be based on historic success. Being such a variable crop nowadays, it'll be down to individual rotations and margin analysis as to whether that level of variability can be tolerated," adds David.

SUCCESS IN SLEAFORD

Two growers who took the risk this year are Robert and Peter Nickols of DE Nickols & Sons near Sleaford in Lincolnshire. Planting 40ha of OSR this season on their 430ha farm, they say they're one of the only businesses in the area still growing the crop, which was once the main non-cereal break crop for most of their neighbours.

Although the OSR area has halved on the farm since its peak – the other half replaced by beans grown for seed – the duo has continued to make OSR pay, attributing their success to timeliness at establishment and choosing a vigorous variety.

"We learned that waiting for balers to arrive doesn't work, so we now chop the straw," explains Robert.

"The tractor is on the drill before we start harvest," adds Peter. "As soon as the field is cleared, we have the seed ready and it's in. In fact, we've had a few years where the drill was in the same field as the combine."

The farm's dedicated OSR drill is a low disturbance subsoiler mounted on a Grange toolbar with an attached Weaving mounted drill and StocksAg Turbo Jet. Seed is placed in 50cm rows at a typical rate of 50 seeds/m2, and a starter fertiliser is applied at the same time.

This drill setup evolved from previous methods where land was subsoiled and the crop was planted using a Väderstad drill that went crossways to the subsoiling. "The only place where there were strong plants was where the subsoiler leg had been so we thought, why waste money sowing in between?" says Robert.

Buckwheat is planted using a spreader as the first pass in the field post-drilling, helping to mask the OSR crop from cabbage stem flea beetle while securing £55/ha for the CIPM3 SFI action.

Establishment methods

East Riding grower Guy Shelby says he's gone full circle with oilseed rape establishment methods and landed back at using a subsoiler.

The cousins have also switched from growing conventional varieties, often as farm-saved seed, to exclusively planting hybrids for their vigour. Robert says: "When CSFB was first an issue, we took the view that home-saved seed wouldn't cost as much if we lost the crop, but we did it at the detriment of vigour.

"We've now moved back to hybrids and have used the cash-back establishment schemes on occasions."

This year they're growing RGT Kanzzas, which they selected based on its vigour. "At the time it was the one that stood out; we've noticed its vigour this year," comments Peter.

BUMPER POTENTIAL

Over at Bishop Burton in the East Riding of Yorkshire is Shelby Farming. With the local climate meaning growers can produce impressive yields if conditions allow, Guy Shelby's OSR crop for Harvest 2022 averaged 6.7t/ha, delivering an incredible return considering the commodity prices at the time, he says.

"On heavy coastal soils and with cool bright days, those kinds of yields aren't uncommon in this area and it's the same with wheat," points out Agrii agronomist, Billy Hosdell.

However, last season told a different story. "It's a lottery – in 2023 I drilled around 100ha and had 12ha left at harvest. Yet this year, nothing has eaten my OSR apart from pigeons," explains Guy.

Shelby Farming is an Agrii iFarm site where Billy used a Bayer Magic Trap to record the levels of adult CSFB last summer and found very few. Whereas in 2023 using a traditional method, he caught 30 beetles per trap ▶

each day in the morning, and when he checked again as he returned home in the evening, found another 30.

Guy says he's gone full circle with his establishment method and landed back at using a subsoiler. He also plants a companion crop, qualifying for the CIPM3 SFI action.

"Our best yields all came from when we were using subsoilers. Then we started using a Mzuri; I think it was one of the best OSR drills on the market. We switched systems and moved to a Horsch Sprinter which worked well, but the yields started dipping off because it doesn't have a deep leg. Now we've gone back to a subsoiler," he explains.

Following a conversation at Cereals Event, Guy replicated Tim Lammyman's approach of sowing both conventional and hybrid varieties by planting Inv1035 and Aardvark together. This is based on the theory that CSFB should target the slower-growing conventional variety, leaving the hybrid to establish successfully. There's also the potential benefit that the shorter conventional complements the taller hybrid, providing a greater depth of podding through the canopy, adds Guy.

> *"We've had a few years where the drill was in the same field as the combine."*

According to Billy, many farmers in East Riding would love to stop growing OSR. "But what do they do instead? We have vining peas in the area but you can only grow them one in five. Then, we've struggled to control bruchid beetle in beans so can only grow for animal feed. A few obscure crops are being planted, but they tend to be one-hit wonders.

"As such, a non-OSR rotation is quite a challenge. It becomes a lot of second wheat, spring barley and oats."

Offering an alternative perspective is Ben Wilson, farm manager at Glympton Farms on the edge of the Cotswolds in Oxfordshire. He says the farm's approach to growing OSR is similar to the Dave Brailsford Method, whereby it's an aggregation of marginal gains.

And it appears to be a success – moving from OSR being on the verge of leaving the rotation, to achieving consistent results. This is because in the 10 years before the 2013 ban on neonicotinoids in OSR, Glympton Farms' yields averaged 3.27t/ha – a respectable return on their drought-prone soils, says Ben. However since the ban, this dropped to 2.57t/ha, leading to a review of OSR's place in the rotation.

CULTURAL MEASURES

This led to Agrii agronomist, Peter Carr, identifying some cultural control measures for Ben to implement. "The first year we didn't quite get things as we wanted them to. But last year, we successfully lined everything up and the crop yielded 3.43t/ha, which is back up to where we expected yields to be before the [neonicotinoid] ban," says Peter.

The first step was to extend OSR in the rotation to one in five. "We've moved into fifths – there are two-fifths wheat, one-fifth barley, one-fifth OSR and one-fifth beans," explains Ben.

Peter adds: "We're cutting stubble long – 20-30cm – and anything before OSR is chopped. This means the burden of straw on the soil surface is about 15mm, so you don't have a thick 50mm mat of straw which is associated with high slug pressure.

"The long stubble also acts as a

Top performer
RGT Kanzzas was second highest yielding in Agrii's 2024 variety trials.

Building biomass, building yield

Evidence suggests there's a close relationship between biomass and CSFB damage

Despite the range of variety traits available to oilseed rape growers, the most desired attribute remains vigour, say agronomists.

Diven by this trait, plus disease resistance, is RGT Kanzzas. David Leaper, Agrii seed technical manager, says Kanzzas followed a strong 2023 performance in the company's trials – finishing the second highest yielding variety in 2024, an average of four sites located across the country.

"One thing we've evaluated is late autumn biomass, analysing how large the plants are going into winter," he explains.

"What's driven our variety choice during the past few years is varieties that grow relatively quickly, producing a big plant with a nice thick stem. Not only are they better at coping with cabbage stem flea beetle, but they're also less vulnerable to weather conditions and pigeons," says David.

Early spring vigour is a factor Agrii correlates against assessed levels of CSFB. David says the firm believes there's a close relationship between spring vigour and lower CSFB symptoms. "Generally speaking, the higher the biomass, the lower the symptoms."

Cultural approaches

After a dip in oilseed rape yields, Peter Carr (L) identified cultural control measures for Ben Bishop (R) to implement on the farm in the Cotswolds.

physical and visual barrier to CSFB. You can't tell there's OSR being grown on the farm until October because the plants are so well hidden in the stubble," he explains. "Equally, the most impressive thing with the chopped straw layer is how it's helped with weed seed suppression – it's led to a 40% reduction in herbicide use."

An application of poultry manure helps to balance the C:N ratio of the chopped straw and provides some available nitrogen in the autumn to build biomass ahead of winter.

The farm opts for a conventional variety with strong spring growth to get the growing point away in mid-February, in this case, Amarone. "It's a steady grower through the autumn and then really moves as soon as the soil warms up in the spring," points out Ben.

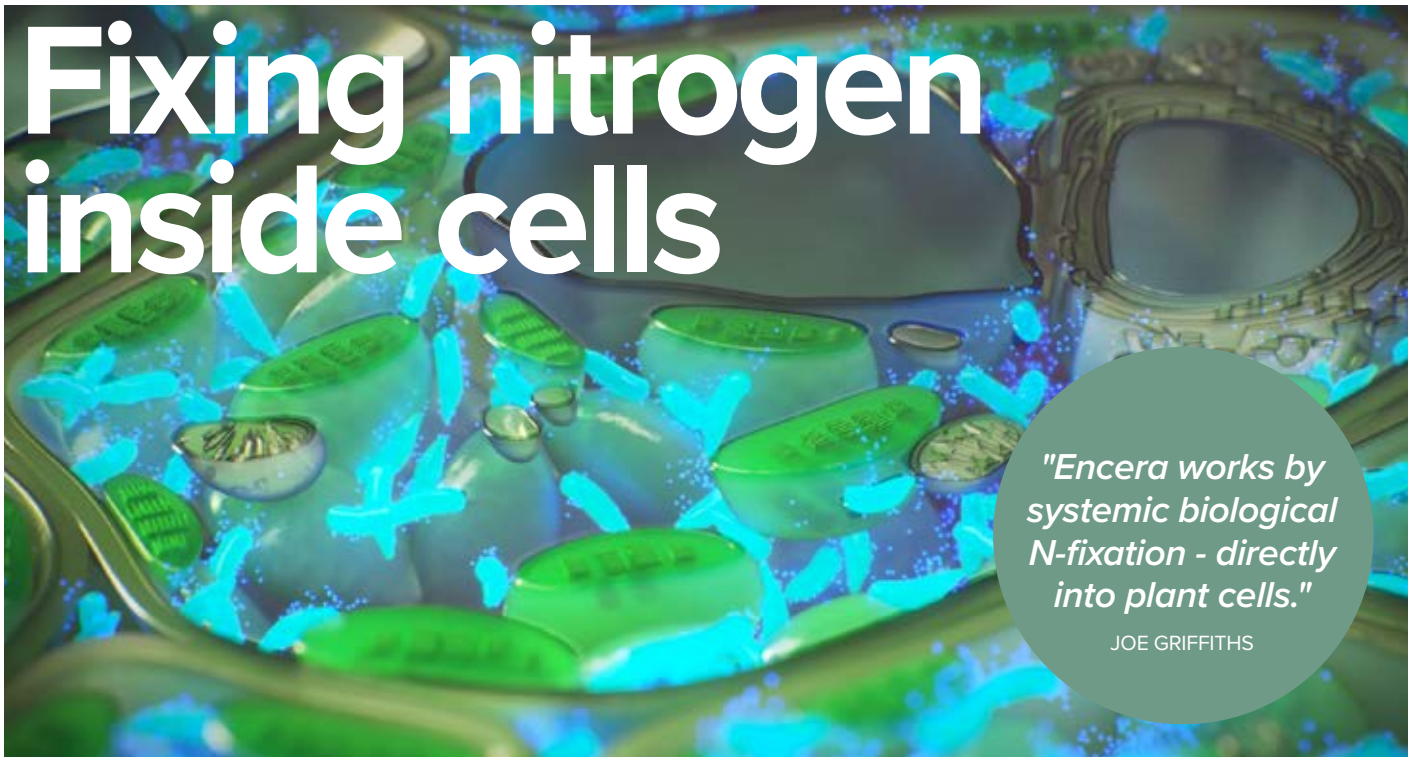
ROOT ACTION

The drill is slightly offset against the previous wheat crop to plant between the rows of stubble, keeping it intact and allowing the OSR roots to utilise the old root system of the wheat crop, he adds.

Buckwheat at 8kg/ha plus 4kg/ha of purple vetch are used as companion crops. The buckwheat provides a canopy above the OSR and its roots mine phosphate which is released to the OSR crop later when the frost kills the buckwheat. By leaving the vetch in the crop for as long into the spring as possible, it can fix 30-50kgN/ha, highlights Peter.

These measures appear to have paid off again this year, with Glympton Farms' OSR looking full of promise as it finishes flowering, comments Peter. Both he and Ben hope it will at least match last year's output. ●

Fixing nitrogen inside cells



"Encera works by systemic biological N-fixation - directly into plant cells."

JOE GRIFFITHS

A flagship technology based on a unique strain of nitrogen-fixing bacteria is gaining traction thanks to its consistent performance in on-farm trials, offering growers an alternative, sustainable approach to crop fertilisation. *CPM* investigates the science behind Encera.

By Janine Adamson

Although fertiliser prices have returned to a level of normality since the eye-watering highs of a few years ago, in many ways, what the experience did do, was shine a timely spotlight on how volatile that aspect of the industry can be.

Coupled with a drive towards improved sustainability and de-carbonisation across the entire supply chain, this has led to increased scrutiny when it comes to sources of nitrogen, believes ProCam's Phil Burrell.

Having formerly worked in the fertiliser sector, he acknowledges that the concept of nitrogen use efficiency (NUE) is nothing new, but says grower awareness is now far greater. "When nitrogen prices escalated it made people think twice about their approach to crop nutrition, which isn't necessarily a bad thing.

"And regardless, even in conventional years, nitrogen is often the greatest investment when it comes to crop inputs, therefore improving NUE should be a priority," states Phil.

In the first instance, this could mean optimising the quantity of applied nitrogen a crop receives based on soil and tissue testing. However, innovation taking place at a laboratory in York is striving to promote a new approach – where a plant-colonising bacteria leads the way.

Gluconacetobacter diazotrophicus, known as Gd, is a naturally-occurring bacteria which converts atmospheric nitrogen into a plant-usable form. It was originally found in Alagoas, Brazil, and was isolated during sugarcane analysis due to its specific features.

It was these attributes which piqued the interest of researchers at the University of Nottingham, and as a result, the company Azotic was formed. By patenting a unique strain of Gd, AZ19, the firm has since released its bacteria-based technology to the UK market under the Encera brand.

Crucially, whereas nitrogen fixation was previously only available to leguminous crops which utilise rhizobia, by colonising cells throughout the plant, Encera opens up this valuable pathway for all crops, says technical sales manager, Joe Griffiths.

"Encera works by systemic biological N-fixation – the bacteria directly enters the plant through its cells via multiple entry points: its stomata, trichomes and roots. This is what makes it unique and therefore different to other N-fixing products on the market, where most bacteria live within the soil or between the cells," he explains.

Once it's entered a plant, Gd continues to multiply within cells, fixing atmospheric nitrogen when and where the plant requires it throughout the growing season. However, being a gram-negative, non-spore-forming endophyte, it requires a host to survive, adds Joe.

"Gd is highly motivated to get inside the plant as soon as possible to form a symbiotic relationship. This critical interaction allows the plant to provide sugars to Gd in exchange for

A shift in thinking

When nitrogen prices escalated it made growers think twice about their approach to crop nutrition, which ProCam's Phil Burrell says isn't necessarily a bad thing.

nitrogen – a beneficial exchange."

The ultimate aim of Encera is to provide a constant, season-long supply of nitrogen, helping to plug the gap when a crop may find it difficult to source its own. In being an alternative source of nitrogen, it's not susceptible to the same constraints faced by synthetic fertiliser such as adverse soil or environmental conditions.

"For example, soil-based nitrogen isn't always available or accessible by the plant due to waterlogging, drought or lock-up," highlights Joe. "But the nitrogen fixed by Gd doesn't have to be translocated – it's available directly in the plant cells."

According to Phil, this helps to de-risk the management of applied nitrogen. "The pressure is only increasing, whether that's from a regulatory or potential tax perspective, or, from the significant drive to reduce carbon in the system.

"There's so much unknown surrounding the fertiliser industry; using a product like Encera means growers can take a level of control and mitigate the impact of those threats which loom on the horizon," he says.

However, he also believes it's important to understand the end goal from an individual farm's perspective. "For those with a lower yield potential this could involve using Encera to complement or compensate, and therefore achieve an overall percentage reduction in applied nitrogen and better ROI.

"Or, in the case of those striving to break through an NUE barrier for higher yield, Encera would be in addition to full rate applied nitrogen."

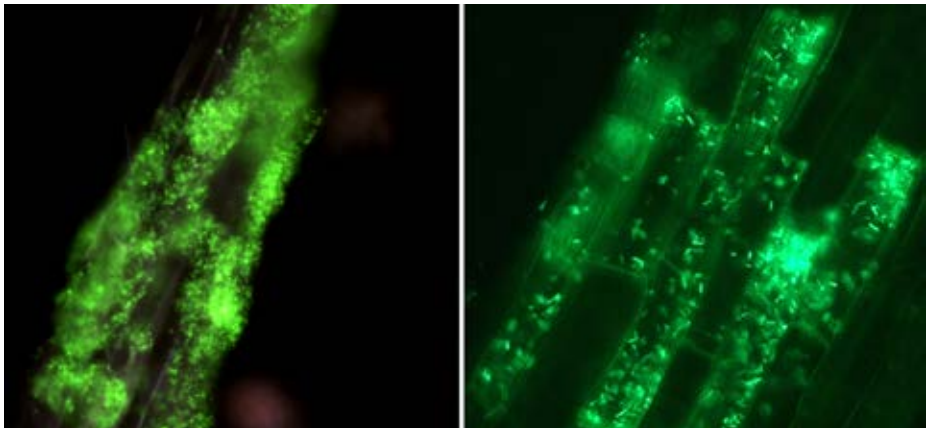
UK trials suggest both approaches can offer measurable benefits, with Azotic working to deliver robust, independent datasets to help instil confidence in its innovative technology.

For one, work undertaken by Eurofins last year across five winter wheat trial sites indicates that on average, Encera offers a 0.32t/ha uplift at a full rate nitrogen regime, compared with the farm standard. Whereas for a 25% nitrogen reduction, around 40-50kgN/ha, Encera compensated while increasing the yield by an additional 0.16t/ha over the farm standard.

Then in potatoes, a crop which Joe believes can significantly benefit from Encera, trials undertaken by VCS in 2024 indicate when applied once at row closure, the product can deliver a 9t/ha yield uplift.

"It's certainly encouraging to see that trials have involved other products too. "We've been comparing Encera with different alternative nitrogen sources and in our opinion, it's the strongest in the marketplace," concludes Nigel.

To learn more about Nigel's trials in Durham including work with mixed farmer William Maughan, see March 2024 issue of *CPM* – 'bridging the gap'.



Root colonisation

Gd bacteria colonising the root section of a tomato plant – at seven days post inoculation, forming a biofilm on the outside of roots (L); and a 14 days post inoculation, inside the root cells themselves (R).

An agronomist's perspective

Nigel Scott has been working with growers to trial Encera across his region in the North East

From 'wow' to 'how', ProCam's Nigel Scott says he's been on a journey with Encera. "Following initial trial work and seeing it in action I was bowled over. So then it was a case of understanding both how the product works as well as what it could realistically offer on-farm," he says.

Given Encera's mode of action is dramatically different to those of conventional crop inputs, Nigel admits the results can be more subtle. "Often this may mean using it to complement an existing fertiliser regime, with the potential to substitute a modest percentage of applied nitrogen.

"However, trialling it on farms, where we can measure its impact, we're achieving solid numbers even during years where yields haven't been great due to adverse environmental conditions."

He believes it's all down to how it's used, and much of that lies in experience and time. "Take into account aspects such as the soil type and soil nitrogen supply (SNS), and use Encera to back up the performance of applied nitrogen.

"While foliar forms of nitrogen are more efficient than bagged nitrogen fertilisers, applying bio-nutrition direct to the plant takes that to the next level by maximising what's available."

Having introduced Encera to his customers across Durham and the surrounding region, he adds that buy-in is increasing. "It isn't about finding a cheap source of nitrogen, far from it. It's about repeated use across seasons based on the product's benefits and seeing results at harvest.

"I personally believe that the way it's been introduced to the UK market – being trialled properly in a robust, professional way – is how we should always consider these types of innovations."

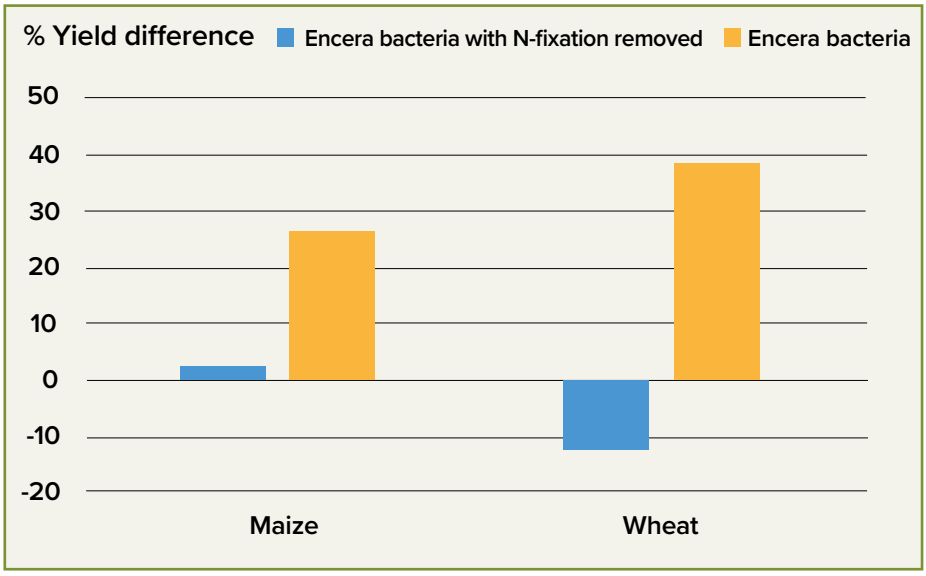
Perhaps importantly, the on-farm

New innovations

According to ProCam's Nigel Scott, taking a robust, professional approach to trialling products is how new innovations should be introduced to the market.

Symbiosis

Gd is highly motivated to get inside the plant as soon as possible to form a symbiotic relationship, explains Azotic's Joe Griffiths.



Evidence of nitrogen fixation

By developing a form of the bacteria without the nitrogen-fixing gene, and comparing with the bacteria in its true natural form, Azotic has been able to prove Encera's nitrogen-fixing ability.

▶ independent work matches in-house trials – we can comfortably state that in cereals, Encera has the potential to replace or fix 15-25% of applied nitrogen, equating to around 30-40kgN/ha."

To achieve this, Joe says it's best to apply Encera early in the season at around T1 timing in wheat, or row closure in potatoes. As the product is based on live bacteria, daytime temperatures should be 10-25^{0}C to ensure the Gd is active and able to multiply.

Azotic has also been using its facilities in York to further develop Encera, moving from a liquid product to a room temperature dry formulation with a two-year shelf-life. "This is an important factor – the product has to fit into existing crop management approaches without specialist storage conditions or applicators.

"Equally, Encera is fully tank-mixable and thanks to a low use rate of 12.5g/ha, is highly concentrated," highlights Joe.

Although supported by various peer-reviewed academic papers and independent trial work as highlighted above, Gd's efficacy remains subject to scepticism in the trade. As such, this has meant further laboratory work for Azotic.

"We wanted to prove that the nitrogen fixation was a direct result of the application of Encera," comments Joe. "So this involved developing a form of the bacteria without the nitrogen-fixing gene, which was compared with the bacteria in its true natural form.

"We found that although the adapted gene offers other benefits to the plant aside from N-fixing, the experiment proved that nitrogen-fixation – as achieved through the bacteria in Encera – was the primary factor driving yield improvement (see graph)."

While some reticence may remain in the UK, Encera is rapidly gaining pace with growers across the Pond where the product is marketed under the Envita brand. Canada-based Tom Tregunno from Azotic says: "Although it's been developed in the UK, we're seeing tangible results in the US, particularly for crops such as maize.

"Grower-led trials indicate benefits such as improved cob uniformity and cob set, a boost in overall cob size, plus a reduction in tip back. It reduces a lot of in-field variability, as demonstrated through yield monitor data. But seeing is believing and we're experiencing a steady uplift in the adoption of Envita's technology," he adds.

According to Tom, because the product has been trialled across a variety of scenarios globally, with positive and consistent results, he believes it offers much flexibility to growers. "The US landscape is highly variable yet Envita is delivering reliable results, therefore we say it 'fits your farm'.

"However, all growers require evidence of a product working well locally in their climate, using their equipment on their land. At the same time, Azotic is working to maximise Envita for northern climates to understand how best to use it in a situation where there could be a yield plateau."

Despite the fact that many questions regarding the technology remain unanswered, he adds that one certainty, is that it works.

To conclude, Phil stresses Encera must be recommended based on its technical merits, rather than traded as a commodity. "This is where it's different to conventional fertiliser – because Encera almost seems too good to be true, it requires guidance and insight.

"Therefore the data and science to support its use is critical to ensure its long-term adoption by understanding its position and the objective of its use." ●

Innovation Insight

Azotic was originally formed in 2012 as a spin-out from research undertaken by the University of Nottingham. Since then, the company has been working to develop *Gluconacetobacter diazotrophicus* (Gd) bacteria into formulated products such as Encera, and prove its efficacy through global trial work.

Having moved to a purpose-built lab in York, Azotic continues to develop and commercialise Encera globally, as well as work on a series of new pipeline biocontrol agents. Products are manufactured and developed in the UK with a production plant in Teesside.

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

A green boost for modern farming?

> *"In the right conditions and as part of a broader crop management strategy, biostimulants can unlock potential that would otherwise be left on the table."*
>
> ANTONIS ANGELETAKIS

CPM takes a closer look at why biostimulants could be the environmentally-friendly solution growers have been waiting for – and how they fit into a modern, integrated crop management strategy.

By Charlotte Cunningham

In a farming landscape increasingly shaped by environmental regulation and market pressure for sustainable produce, biostimulants are stepping into the spotlight as a key part of the regenerative farming toolbox. These naturally-derived inputs don't replace fertilisers or crop protection products, but instead work alongside to support plant health, improve nutrient use efficiency, and enhance crop resilience — offering growers another route to achieving yield and quality goals sustainably.

Rather than directly supplying nutrients like fertilisers or controlling disease like fungicides, biostimulants act more subtly — stimulating the plant's own physiological processes and improving soil microbiome activity. This can translate into improved root architecture, greater drought tolerance, better nutrient uptake, and even enhanced salinity resistance – all of which can have an impact on the green credentials of growing arable crops.

"They're not a silver bullet," stresses Antonis Angeletakis, director of biostimulants at Yara International. "But in the right conditions, and as part of a broader crop management strategy, biostimulants can unlock potential that would otherwise be left on the table."

This is a sentiment Yara's Natalie

Genuine plant support

Yara's Natalie Wood says modern agriculture is seeing a dramatic shift towards scientifically backed, targeted biological solutions that genuinely support crop health and productivity.

Wood agrees with: “Today, we’re seeing a dramatic shift towards scientifically backed, targeted solutions that genuinely support crop health and productivity.”

Antonis explains that not all biostimulants are created equal and having a sound understanding of this is key to optimising their usage. Microbial products, for example, operate quite differently to non-microbial ones — even when they’re targeting similar outcomes like nutrient uptake or phosphate solubilisation, he says. “Microbial biostimulants introduce living organisms into the soil which means you have to assess compatibility with existing soil biology. Introducing non-native strains requires careful evaluation to avoid disrupting the balance.”

These nuances make it all the more important that growers understand how and when to apply different products. Factors like soil health, weather, and existing fertiliser practices can all influence outcomes, meaning a one-size-fits-all approach isn’t suitable, points out Antonis.

Taking a scientific approach to biostimulants is something Agrovista agronomist Pete Waltham is passionate about. With a background in biochemistry and molecular microbiology, Pete says that reimagining how farmers nurture their soils and crops – utilising tools like biostimulants – is key to building sustainable, environmentally-friendly businesses.

“The age of simply spreading fertiliser and expecting perfect results is over,” he stresses. “Our soils have been under immense pressure and we’re now seeing the consequences of decades of intensive agricultural practices.”

Pete concurs with Antonis and says biostimulants have evolved into sophisticated scientific solutions that offer farmers targeted approaches to crop nutrition and soil health – both of which can help tick ‘green’ boxes for farm management. “These products are partial solutions,” he emphasises. “We’re not completely replacing traditional fertilisers, but we’re finding smarter ways to use them and incorporating products which can complement them.”

At the heart of Pete’s approach is addressing nitrogen management. “Farmers are increasingly recognising that simply applying more nitrogen isn’t sustainable. To grow a crop today, you require significantly more nitrogen than 30 years ago,” he explains. “The fundamental reason? Our soils are nowhere near as good as they used to be.”

Building sustainable businesses

With a background in biochemistry and molecular microbiology, Agrovista’s Pete Waltham says reimagining how farmers nurture their soils and crops – utilising tools like biostimulants – is key to building sustainable, environmentally-friendly businesses.

MOLASSES PRODUCT

In Pete’s experience, incorporating products like L-CBF Boost – from QLF Agronomy – is changing this narrative. “Based on molasses and containing humic acids, such biostimulants can help farmers to potentially reduce nitrogen inputs by 10%. More importantly, these products support soil microbial communities, helping to restore the delicate balance of soil ecosystems.”

Going beyond simple nutrient replacement, Pete has also been exploring innovative products which work with plant biochemistry. “Take 2-oxo (2-oxoglutaramate) products for example, these directly support nitrogen assimilation into amino acids. Then there are endophyte treatments that can reduce nitrogen requirements by up to 30kgN/ha. These are all worth exploring and could play a fundamental role in increasing profitability and green credentials,” he says.

At critical growth stages, Pete recommends targeted interventions. “A chlorophyll-based product at T2 timing, for instance, can enhance photosynthesis and potentially support the plant’s innate immunity against pathogens, making it less reliant on synthetic protection products.”

Underlying all of Pete’s recommendations is a fundamental commitment to soil health – something he believes the right biostimulants can have a huge benefit to. But understanding soil health goes far beyond simple nutrient measurements. For Pete, the carbon-nitrogen (C:N) ratio represents a critical indicator of soil ecosystem health, with profound implications for crop production.

“When the C:N ratio becomes imbalanced we trigger a cascade of negative consequences,” he explains. “A low carbon-nitrogen ratio creates a hyperactive bacterial environment which can rapidly mineralise organic matter faster than it can be replenished. This process might seem beneficial at first, but it leads to a destructive cycle of soil degradation.

“Excessive bacterial activity actually

starts to consume organic matter at an accelerated rate," he warns. "As organic matter decreases, we lose both the habitat and food source for crucial soil microbes. This reduction creates a compounding problem: less organic matter means reduced microbial diversity, particularly among beneficial fungal communities."

The implications extend beyond microbial health. Depleted organic matter compromises soil structure, reducing air circulation and creating conditions that favour anaerobic microbes – typically less beneficial to crop production. These microbes can potentially harm crop root systems and reduce overall soil health, says Pete.

Particularly problematic are agricultural practices involving heavy slurry and digestate applications with high nitrogen but low carbon content, he adds. "Year after year these practices can catastrophically affect soil structure."

The solution lies in carefully managed inputs that maintain a balanced C:N ratio, with biostimulant products which contains molasses and humic acids able to help restore this delicate balance by providing carbon-rich materials that support microbial diversity and slow-release nutrient cycling.

Healthier crops and better soils all support overall crop production, and according to Antonis, there's much potential in exploiting untapped yield potential with biostimulants. "The five-year average wheat yield in the UK is around 8t/ha, but in 2022 a record 18t/ha was achieved," he notes. "That's a huge gap — and it highlights the potential headroom available. Biostimulants, if used correctly, can help to close that gap."

Yara's own trials investigating this show promising results, with typical yield increases of 5–6% observed in cereals. In high-value crops like potatoes, vegetables, sugar beet, and fruit, the benefits are even clearer, he adds. "We've seen win rates of 85% in these crops with yield increases averaging around 8%."

REPLACING INPUTS

Trials are also at the heart of UPL's approach, with a new project dubbed '25 in '25' kicking off this spring. Head of technical services Stuart Jackson explains that the aim of the project, which is currently in the pilot stage, is to see if it's possible to replace 25% of synthetic inputs with the same quantity of biological solutions.

"Our goal is no longer just maximising yield, but creating inherently more resilient agricultural systems,"

Slashing synthetics in new trial

In a trial launched this spring, UPL is aiming to see if it's possible to replace 25% of synthetic inputs with the same quantity of biological solutions, explains the firm's Stuart Jackson.

he explains. “With biostimulants, we’re building plants with superior root architectures which can naturally combat environmental stresses like drought, extreme temperatures, and nutrient limitations – and this project is set to unveil just how far we can push this.”

BIOLOGICAL INTERVENTION

The trial is taking place on three commercial farms, with each dedicating a portion of their winter wheat fields to a biological intervention. “By strategically replacing synthetic inputs with advanced biological solutions, the technical team is testing the limits of sustainable crop production.

> *“The age of simply spreading fertiliser and expecting perfect results is over.”*

“We didn’t just want to talk about marginal reductions either,” adds Stuart. “We’re looking to comprehensively replace 25% of traditional synthetic inputs with biological alternatives across multiple intervention points.”

A split-field methodology has been deployed with the trial farms having received a loading dose cocktail of biological products, which will be followed at subsequent key growth stages through the season, explains Stuart.

Delving deeper into what biostimulants will be used, and as nitrogen management represents a key focus area for the project, the team are looking at replacing traditional fertilisation with products such as R-Leaf, an innovative microbial product designed to enhance nitrogen fixation. Fulvic acids will also be introduced to improve nutrient transportation and metabolic efficiency, potentially reducing the need for synthetic fertilisers, explains Stuart.

Disease management in the trial follows a similar approach and instead of relying solely on traditional fungicides, the team is optimising the use of laminarin to trigger the wheat’s natural disease resistance mechanisms. This approach aims to build intrinsic plant resilience rather than creating external chemical protection, he adds.

Looking at the current stage of the trial, farmers are now applying treatments at the T1 growth stage with the research team carefully monitoring plant health, disease resistance, and early yield indicators. Success will be measured not just by crop yield, but by overall economic return and environmental impact, emphasises Stuart. “Profitability remains our ultimate metric – we’re essentially trying to prove that reduced synthetic inputs don’t mean reduced farmer returns.”

Early indications appear promising. Initial observations suggest that the biologically-treated crops demonstrate comparable vigour to conventionally-managed fields, with potentially superior stress resistance. Full results are expected later this year.

“This isn’t just an agricultural experiment – it’s a potential blueprint for a more sustainable farming future,” concludes Stuart. “If successful, the trial could provide a scalable model for reducing agricultural chemical dependency while maintaining food production capabilities.”

In-season nutrition adjustments key to optimising cereal crop performance

Experts at ADAS say checking and adjusting nutrition strategies throughout the season is vital for good crop performance and efficient input use

With spring in full swing, crop walks across the country should be focusing not just on spotting pests and diseases, but increasingly on evaluating crop nutrition. This is according to Dr Sarah Kendall, crop physiologist at ADAS, who says visual checks provide a vital opportunity to refine nutrient strategies in real-time.

"The first fertiliser plan often comes together before the season starts," she says. "But if you stick rigidly to that, you miss the opportunity to respond to how well crops have actually established or any seasonal quirks. In-season observations help to tailor nutrient applications more precisely."

Dr Kate Storer, ADAS crop physiologist, is urging growers to pay close attention to signs such as crop growth stage, leaf colour, shoot number, and rooting. These can indicate emerging nutrient deficiencies sometimes before physical symptoms are obvious, she warns.

"It's not about scouring every square metre," she says. "Use guides like AHDB's RB209 to know what symptoms to look for. Focus on field areas where issues are likely such as corners or low-lying ground. Then assess whether any action is worthwhile — some deficiencies can be too advanced to correct or low product efficiencies can minimise potential to rectify."

If a deficiency is identified and treatment is viable, adjusting fertiliser strategy should be targeted and measured. "One of the simplest methods is to leave an untreated tramline," says Kate. "But be careful to not choose a tramline with unrelated issues like compaction or different soil types."

If an issue can't be corrected this season, Kate recommends grain analysis after harvest to inform decisions for next year. "It's still incredibly valuable data. You may not solve the problem this time, but you're setting yourself up to avoid it in future seasons."

When it comes to assessing crop nutrient status mid-season, several tools are available — each with their own strengths and limitations.

Kate recommends firstly looking at soil mineral nitrogen levels which can vary widely across fields, especially following wet winters. ADAS recommends either using the field assessment method (based on soil type and previous cropping) or the measurement method, which involves laboratory testing. "Where soil nitrogen supply is uncertain, particularly after heavy rainfall, lab tests offer a clearer picture," she says. "That gives more confidence in adjusting N rates appropriately."

NDVI tools often integrated into drone or satellite imagery platforms can also be used to estimate canopy size and greenness. While potentially useful for identifying spatial variability, Kate warns to not rely on NDVI alone. "It's best used to compare relative differences such as treatment trials. But other factors like pest pressure or soil differences can also affect readings; NDVI doesn't always correlate well with final yield."

Broad-spectrum leaf analysis is another approach which offers a snapshot of nutrient status – although interpretation still lacks consistency across laboratories, adds Kate. "The most useful way to use leaf tests is comparatively—take samples from a problem area and a healthy area. That gives you a better handle on what's going on, just be sure to stick with the same lab year on year."

Spotting the signs
ADAS' Dr Kate Storer is urging growers to pay close attention to signs such as crop growth stage, leaf colour, shoot number, and rooting this spring as these can indicate emerging nutrient deficiencies sometimes before physical symptoms are obvious.

In terms of areas to watch, she warns that sulphur deficiency is becoming more common particularly in cereals due to reduced atmospheric deposition and leaching during wet winters. "By the time you see symptoms, it's often too late. If in doubt, test leaf tissue using a malate sulphate test. We've had very good responses to sulphate application in trials where deficiency was confirmed."

Views from the field

South Shropshire farmer Andrew Williamson is a firm believer in letting the crop guide nutrient decisions. Farming 364ha of combinable crops, he uses variable rate N technology to respond in real-time and has been part of the Nutri-Check Net Crop Nutrition Club trials. "There's so much variation across a field – it's not just about applying evenly. Tools like the N tester give us a good snapshot while the data from our soil moisture probes helps with timing."

Further north in Fife, fellow triallist David Aglen agrees. "We've undertaken all sorts of testing – soil N, SAP analysis, N testers – but it comes down to understanding how representative the data is. In Scotland, we're often dealing with slower crop development so we have to be even more flexible."

David finds value in N testers for in-field decision making but is cautious regarding over-reliance. "If it tells you to push 300kg N, you have to balance that with experience and economics. SAP analysis had potential, but delays in getting results back made it hard to act in time. If we can get live data in field, then we can get something on during the next day to help."

Ultimately, both scientists and farmers agree on one point – being reactive and observant through the season is the best way to optimise crop nutrition. Whether it's spotting a leaf colour change, trialling a tramline treatment, or adapting a fertiliser plan based on in-field data, success hinges on tuning in to what the crop is telling you.

Smith's SOAPBOX

WITH GUY SMITH

Owls of delight

In my previous column I mentioned we were about to replace one of our owl boxes because it was becoming very dilapidated after 25 years of use. The good news is, that within days of replacing the box in late March, it had occupants.

It's heartening to know there are couples out there looking for good quality accommodation. Personally, I felt a little conflicted between delight to see such immediate success, along with a twinge of guilt because I hadn't changed the box before. Barn owls only live for on average four years, so you really shouldn't delay these things.

They're also one of the iconic species of the British countryside. Their screeching calls at night are one of those haunting sounds that adds a bit of magic to living on a farm. It's this time of year when they're most active as they have hungry young to feed.

A barn owl typically eats 3-4 prey items a night, usually voles. During the breeding season, a pair of barn owls will (ideally) find this amount for each owlet as well. Given some broods can have up to five chicks, it can make for a busy night.

Might this encourage some rainfall?

Barn owls are notoriously difficult to count because of their nocturnal habits. Indeed there's a school of thought that plenty of daylight sitings may be a bad sign, as it suggests the owls are desperate for food and are hunting outside their preferred times.

So when it comes to assessing how well the species is doing, the best figures to look at are brood figures where nest boxes are inspected and chicks are rung. The good news is that these figures during the past few years are positive. Long may they thrive.

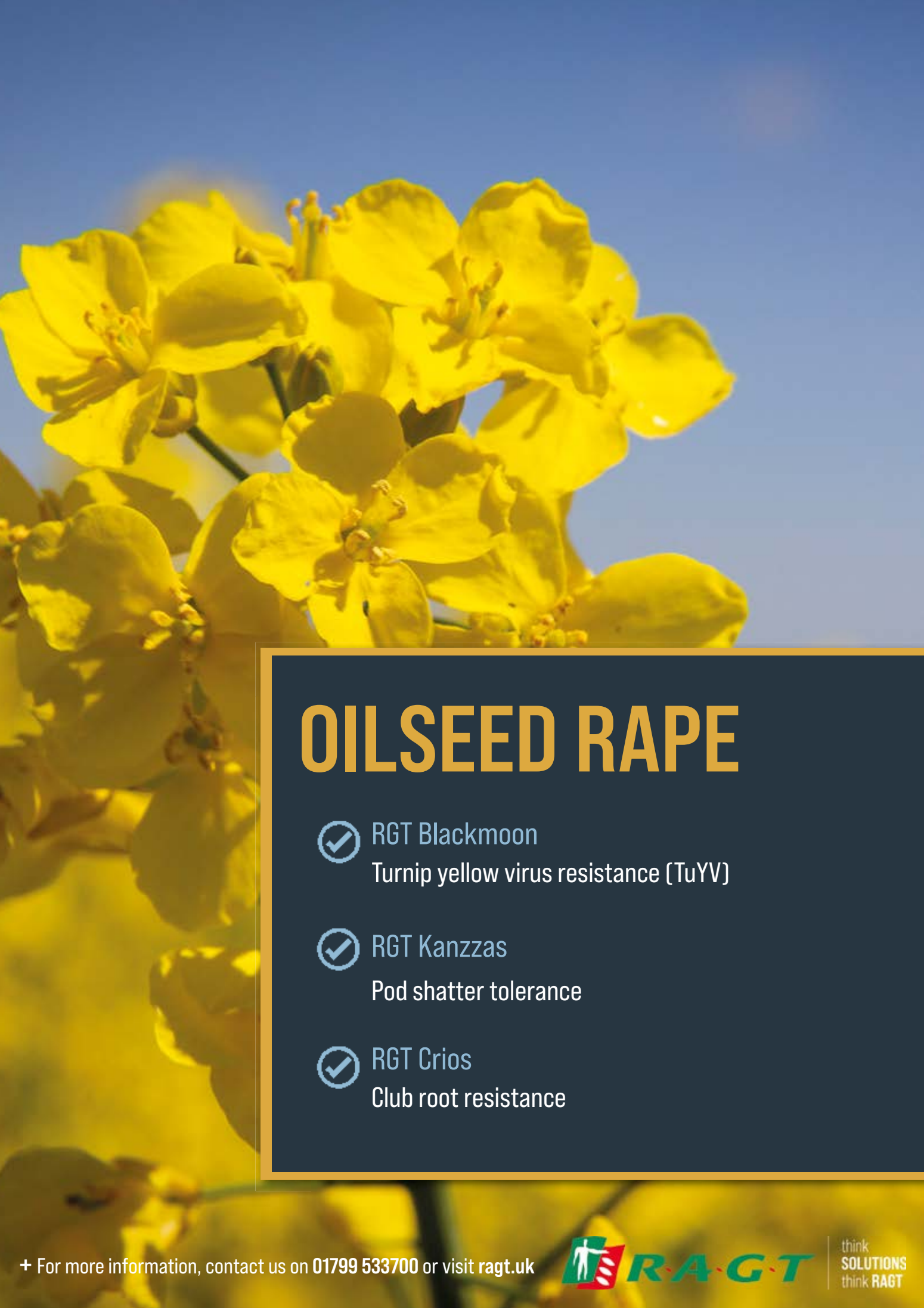
I realise I'm not alone in that the months of March and April combined gave us less than an inch of rain. To date, the month of May hasn't significantly added to that paltry total. For fear of sounding dramatic, there are deserts that get more spring rainfall than this. I can't remember a spring where we seem to be permanently in the grip of an easterly wind either.

In the words of the old farming weather lore 'a wind from the east is no good for man nor beast'. The point being, that east winds are usually cold and dry. Out in the fields the crops seem to be bearing up reasonably well but are starting to stress. There was probably just enough rain to wash the fertiliser in but the next few weeks will be critical.

So I enclose a photo from April 1997 in the hope it might encourage some rain. I recollect the harvest that year was saved by June rainfall. Here's hoping for a repeat. ●

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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A new vibe

A new milling wheat variety has entered the Recommended List, offering high treated and untreated yields alongside all-round high quality attributes and agronomics. *CPM* investigates if this new vibe could reinvigorate Group 1.

By Melanie Jenkins

Those keeping an eye on the milling wheat sector may have noticed a new player on the team which could provide UK growers with renewed vigour, but what sort of vibe will the variety bring to the field?

New Group 1 KWS Vibe brings genuinely improved performance to a sector which has seen few new additions in recent years and is the new 'protein' banker for the UK, believes KWS' Olivia Bacon.

Vibe has the highest overall protein production potential on the latest AHDB Recommended List, slotting in just behind KWS Zyatt for yield, she says. "The variety has the best combination of protein and yield of all Group 1 varieties, but with a much better plant package for growers than previous varieties.

"Its yield of 98% of controls combined with a milling specification protein content of 13.2% sets it apart from its competitors, as does the most comprehensive agronomic package of all the key Group 1 players."

Cefetra's Mary-Jane Bridgford agrees, noting that Vibe's combination of yield, grain quality and disease resistance along with its suitability across all regions, is providing growers with a new and appealing option. "It's been a long time coming but the variety is certainly living up to its name so we're really excited about it.

"In recent years we've seen some strong additions to the other groups on the RL which has widened the gap between the Group 1 varieties for both yield and disease resistance. So as an

High untreated yield

In RL trials KWS Vibe achieved 98% of control across the UK, recorded its highest yield in the West at 100%, 99% in the North and 97% in the East, with an untreated yield of 89%.

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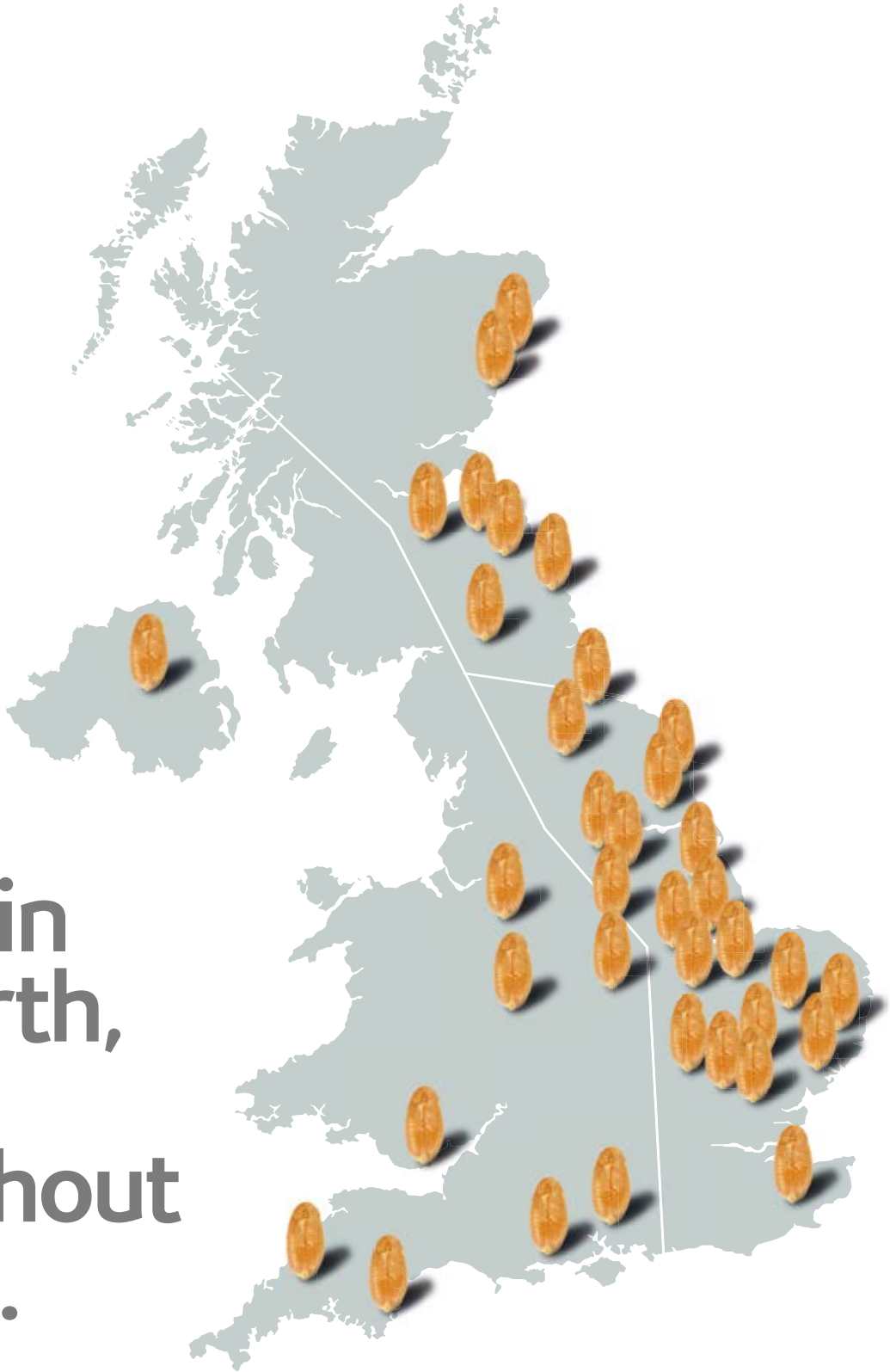

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industry, we were keen to see a new Group 1 variety like Vibe that gives both excellent milling quality and disease resistance, to ensure we continue to see UK-grown milling wheat."

Homegrown milling quality wheat is a significant part of UK food security, so the UK flour milling industry requires a productive, profitable domestic farming sector which can meet quality requirements year after year, emphasises Joe Brennan of UK Flour Millers.

CONSISTENT PERFORMERS

"Group 1 wheats are the backbone of UK bread making flour. These are the varieties that we can rely on season after season to produce sustained, high levels of consistent milling and baking performance. They tend to be higher protein wheats, which we term as hard milling. These wheats also have the strong gluten which is crucial to produce the large, relatively tall loaves of bread which UK customers prefer."

Joe adds that last season was extremely challenging for farmers and followed several difficult years. "We're seeing this feed into the UK milling industry with our projected use of homegrown wheat for 2024/25 under 70%. This is the lowest proportion in more than 20 years and quite different to a typical year when we use at least 80% homegrown wheat.

"A significant part of the reason for that is the decline in Group 1 wheat production in the UK, from more than 4.5M tonnes in 2019 when it accounted

Food security
Homegrown milling quality wheat is a significant part of UK food security, emphasises Joe Brennan of UK Flour Millers.

Performing well in trials
Vibe has been grown in both large-scale plot trials and in split-field commercial trials for Harvest 2024 on Heathcote Farms and in both cases, the variety performed well.

Passing the test

KWS Vibe holds its own on farm during challenging season

Farms director at Heathcote Farms in Bedfordshire, Andrew Robinson, has a close relationship with KWS, overseeing trials at the enterprise's main site at Toddington for some time. Operating across three main units, there's a mix of medium, greensand and chalk soils.

The rotation has adapted to become more flexible, usually consisting of a first and second wheat or barley, followed by a break crop, which will either be oilseed rape, peas, beans or oats, says Andrew.

"We run a lot of trials at Toddington and have done so for many years but have ramped up the amount of trial work since 2014. We're fortunate to have worked very closely with KWS for many years and this two-way relationship has seen us benefit from seeing some of the firm's new varieties before commercial release, with Vibe being no different.

Andrew grew Vibe in both large-scale plot trials and in split-field commercial trials for Harvest 2024 and in both cases, the variety performed well. "It had good treated and very good untreated yield, was stiff and its disease scores followed through, with the variety remaining clean during an extremely testing season.

"During which we saw our wheat yields down from our 10-year average of 11.46t/ha to 10.18t/ha, but in the commercial split-field trial, Vibe yielded above the year's average at 10.53t/ha.

"We've planted 55ha for Harvest 2025, some of which was planted just before the biblical rain we had on 22 September 2024, while a further two fields were sown in early November," he explains. "Incredibly, more than 90% of the September-drilled crop has survived, which we believe is partly down to the variety's strong vigour."

The crop has had a pre-emergence based around aclonifen but no post-em due to the ground being saturated, adds Andrew. "As of mid-April it's received 51kg/ha SO3 plus 185kgN/ha and it's due another 55kgN/ha; the September-drilled area has had a T0 based around a PGR, nutrition and the biostimulant Scyon.

"Vibe has come through the winter extremely well considering the start it had, plus I've seen good vigour in the spring as well. So far it looks clean but I want it to yield 3-4% above Crusoe and RGT Illustrious while achieving 13% protein to maintain its position on farm," he concludes.

for approximately 28% of the UK wheat area, to just above 2.5M tonnes, 25% of the UK wheat area, in 2024."

Another issue with Group 1s is a decline in the ability of farmers to achieve the required specifications, often linked in recent seasons to unfavourable weather conditions and exceptionally high costs for inputs such as nitrogen fertiliser, he points out.

"Data from AHDB's Cereal Quality Survey indicates that the percentage of Group 1 wheat meeting specification (13% protein, 250 Hagberg, 76kg/hl) declined from 48% in 2018 to just 13% in 2023, with a slight bounce back to 20% in 2024," he says.

Vibe is unusual in that it achieved Group 1 performance at NL1 and NL2 in 2022 and 2023, as well as the RL stage in 2024 – three contrasting seasons, highlights Olivia.

BAKING QUALITY

"Characterised by good grain quality, including a Hagberg of 283 and a specific weight of 79.1kg/hl, it consistently delivered higher protein at 13.2% than the control in each of the three years, exhibiting good gluten quality, loaf volumes and overall baking performance."

Looking closer at its bread-making characteristics, Olivia notes that in baking tests at the Allied Technical Centre, Vibe has outperformed KWS Zyatt in every situation. "It has a softer, white crumb, larger loaf volume and good loaf height, as well as improved layering performance in pastries and better crumb in rolls. Vibe will appeal to milling wheat growers who want a variety which combines high yield with high protein."

In trials by millers, Vibe demonstrated high quality, protein and specific weight as well as consistent breadmaking performance season after season, says Joe. "This is what defines a Group 1, as opposed to a Group 2 variety.

"As an industry we assess varieties at NL1, NL2 and RL stage, so three years of testing. And for Group 1 wheats we also carry out a commercial assessment where we have 60t of each new variety grown to standard milling specification and send it to flour millers to be milled on a commercial scale.

"Batches of 1t of that flour go to mills across the country, even those not involved in the earlier three years of testing, allowing us to confirm what we've seen during the previous three years – that the variety is of the consistent quality that we'd expect from a Group 1 and that it should command a corresponding premium."

Based on this, Vibe has been fully approved by the flour milling industry as a Group 1 following commercial scale quality assessments, he points out.

In RL trials it achieved 98% of control across the UK, recorded its highest yield in the West at 100%, 99% in the North and 97% in the East, with an untreated yield 89% of control, says Olivia.

"Across the rotation, KWS Vibe delivers excellent performance, both as a first wheat at 98% of control and as a second cereal at 97%, which is important because 60% of milling wheats are sown in the second cereal position. In the early

Northern suitability

KWS Vibe's slow development, its ability to tiller, and a score of 7 for eyespot resistance makes it an ideal variety to start drilling early, a key requirement for growers further north, says KWS' Olivia Bacon.

and late sown slots the variety achieved 98% and 99% of control respectively, 98% on both light and heavy soils."

Offering a strong agronomic package with no weaknesses, Vibe provides improved disease ratings and untreated yield than comparators, she highlights. "Vibe has a 7 for eyespot and mildew, it scores 8 for yellow rust which will really help Group 1 milling wheat growers, together with a 6 for brown rust, 6.6 for septoria and 6 for fusarium."

Although it appears there aren't any major weaknesses to the variety, Cefetra's Kate Armstrong points out that it doesn't have orange wheat blossom midge resistance. "This is something to be aware of, but this is the case for most Group 1 varieties.

"It also has a reasonably slow growth habit up until GS32 which should be considered in regard to its competitiveness against weeds," she adds.

Winning combination

Cefetra's Mary-Jane Bridgford notes that Vibe's combination of yield, grain quality and disease resistance means it's providing growers with a new and appealing option.

KWS Vibe at a glance

Yield (% treated controls)	
UK treated	98
UK untreated	88.8
East region treated	97
West region treated	99.6
North region treated	[99]
Grain quality	
Specific weight (kg/hl)	79.1
Protein content (%) – milling spec	[13.2]
Hagberg Falling Number	283
Agronomics	
Resistance to lodging without PGR	7.7
Resistant to lodging with PGR	7.9
Straw length without PGR (cm)	87.8
Ripening (days +/- Skyfall)	+1
Disease resistance	
Mildew	[7]
Yellow rust	8
Yellow rust (young plant)	S
Brown rust	6.4
Septoria	6.6
Eyespot	7@
Fusarium ear blight	6.4
Orange wheat blossom midge	-

Source: *AHDB Recommended List, winter wheat 2025/26. [] = limited data. @ = Believed to carry the Pch1 Rendezvous resistance gene to eyespot; as this is a breeders' claim, it has not been verified in RL tests.*

Vibe is stiff strawed and 87cm high without a PGR, has an 8 for resistance to lodging with or without a PGR, and is rated +1 days for ripening compared with the control, comments Olivia.

"Regional dates for sowing are from 1 September in Scotland and North Lincolnshire/Yorkshire, 15 September for the West and Midlands, and 20 September for East Anglia, the Midlands and South, with the latest safe sowing date at the end of January," she says.

Whereas Vibe's slow development, its ability to tiller, and a score of 7 for eyespot resistance makes it an ideal variety to start drilling early, a key requirement for growers further north, adds Olivia. "In addition, it delivers some of the highest yields compared with current Group 1 wheats on the current RL in this region, giving growers access to premium market opportunities where available.

"In the East and West regions Vibe is all about yield, market potential, disease resistance and field performance, making it one of the most profitable wheats a farmer can grow."

Cefetra's confidence in the variety is clear from its buyback offering. "We've had a buyback for Harvest 2026 in place because we know that Vibe has huge marketability due to its consistently high protein levels, even during the past two seasons when we've seen some of the other Group 1 varieties struggle to make full spec milling quality," concludes Kate. ●

Late April-drilled wheat defies odds

Despite being a highly bold and risky move, drilling Blackstone in late April 2024 delivered the goods for Stranraer-based grower, Jamie Kyle

With autumn conditions proving relentless for two years on the bounce, Scottish grower Jamie Kyle had little choice but to find an alternative route forward to enable the farm to continue growing winter wheat.

This led Jamie, who runs family business Robstone Farming Company together with his parents and brother Iain, to seek out a winter wheat variety which could be spring-sown. However, what followed may prove astounding, even to the most risk-inclined individuals.

That's because in researching a suitable variety, Jamie was advised by agronomist Cameron Ferguson to consider Group 4 soft wheat Blackstone, based on its vernalisation data indicating its potential when drilled in March. But thanks to continued inclement weather, this was pushed to the absolute limit.

"The original intention was to drill Blackstone in March, however, after ordering the seed we had another weather set back and the ground wasn't suitable for drilling until late April – more than a month later than we'd intended.

"We'd already paid for the order and spring seed wasn't available. So with few other options and despite both the breeder's and AHDB's official advice, we took a calculated gamble and drilled 10ha of Blackstone at a high seed rate of 400 seeds/m² on April 28 following a late harvested potato crop," explains Jamie.

Although the quality of the seedbed was poor to moderate, plus a pre-em herbicide couldn't be applied, he says the crop showed competitive early vigour and raced through its early growth stages.

Flexible drilling

Blackstone's drilling flexibility means it could be a good option given the ongoing weather challenges in Scotland.

"For nutrition, two main splits of nitrogen were applied totalling 160kgN/ha, and on Cameron's advice, we went with just a two-spray fungicide programme. Spring is a relatively short season in West Scotland, so any septoria present was coming into a growing crop not waiting to explode since the winter, meaning I believe it was the right call."

He says T1 was applied on 17 June comprising 1.0 l/ha of bixafen+ prothioconazole+ spiroxamine, plus 1.0 l/ha of folpet. It was applied two weeks after Blackstone had received its second split of nitrogen, and having tillered well, was looking exceptionally green and lush by mid-June, adds Jamie.

"For an extra boost we went with 3.0 l/ha of Seamac Gold foliar biostimulant. Then T2 was applied on 18 July using the same chemistry as the T1, but increasing the rates of bixafen+ prothioconazole+ spiroxamine to 1.2 l/ha."

> *"In the context of the risk we took I was delighted with the overall results."*

Jamie highlights that Blackstone stood well throughout the summer with no signs of lodging, although it always appeared slightly forward. "And despite some high septoria pressure, it looked almost as clean as our other winter wheat Extase.

"The one slight disappointment was that we didn't get the grain swell in the spring crops due to a lack of sunlight that summer, which probably hurt the final bushel weight."

Harvest took place on 3 October with Blackstone achieving a final overall yield of 7.4t/ha at 15% moisture.

"The final bushel weight was also better than we'd anticipated at 74.2kg/hl with a very respectable straw yield of 3.7t/ha. Based on these results I've increased my area of Blackstone to 16ha for Harvest 2025 with a firm eye on the distilling market, due to having William Grant's distillery on our doorstep.

"In the context of the risk we took I was delighted with the overall performance. Blackstone showed excellent early vigour, stood really well, didn't require a PGR and produced a lot of very stiff straw," comments Jamie.

With the ongoing weather challenges in Scotland he believes there's a place in rotations for varieties with Blackstone's drilling flexibility. "Given its performance last year, I'd definitely put it ahead of a spring wheat despite its winter wheat classification," he says.

After hearing the news of Blackstone's remarkable late-sown performance on Jamie's farm, Elsoms' Toby Reich, adds a word of caution. "While it's always great to hear about successful outcomes from our varieties, if you're considering drilling any Elsoms variety after its latest safe-sowing date, please check with our team of experts first, as we may have more information about the risks.

"AHDB's official latest safe sowing date for Blackstone is the end of February, however, without speculating on yield-potential impacts, varieties such as Blackstone do show good levels of vernalisation, even in plots sown into late March," concludes Toby.

Adapting to the challenge

The newest variety from Limagrain, LG Adapt, offers improved potential across the board with a high gross output and all-round agronomics. *CPM* explores how this variety could help growers to adapt to the challenges with the crop.

By Melanie Jenkins

To adapt is to change to the circumstances or conditions at hand or to become suitable to a new purpose, something all oilseed rape growers are likely to desire in any variety they plant, and is something Limagrain's latest variety, LG Adapt, could potentially deliver on.

A new fully-loaded hybrid variety, Adapt has come onto AHDB's Recommended List with the highest gross output in the North region at 108%, and consistently scores the same across all regions, highlights the firm's Ron Granger. "It's a consistent variety which can be seen with its results from the 2022, 2023 and 2024 seasons, where it achieved a UK average gross output of 107%, 108% and 108%, respectively."

With 46.4% oil, Adapt is second only to Dolphin for this attribute on the RL. "It has a really high oil content and is one of a new generation of varieties with increased oils," adds Ron.

United Oilseeds' Beckii Gibbs says the appeal of Adapt lies in its flexibility and consistency. "It's a variety that really stands out for growers wanting to maintain OSR in the rotation despite ongoing pressures. In a volatile environment, growers require reliability, and Adapt offers that, strong gross output, excellent oil content, and a proven track record across regions. Through the wider OSR Reboot best practice guide, we're working with the industry to give growers confidence to stick with the crop and Adapt is exactly the kind of variety that helps make that possible.

"As a fully UK-recommended variety it's shown consistently strong performance across the country, and its high oil percentage means growers are well placed to take advantage of valuable oil bonuses," she adds.

It's a variety which David Leaper is pleased to be offering to Agrii's customers and concurs that a UK-wide recommendation is an important attribute to have. "Some varieties are obviously best suited to certain regions, but we also want options which can be successfully grown across the UK.

"Adapt sits well alongside Maverick which is an E/W focused variety, and looks

UK bred

Adapt has been produced through Limagrain's UK breeding programme where it started life as a cross, says the company's breeder, Maeve O'Rourke.

New trumps old

Limagrain's Ron Granger believes newer varieties like LG Adapt are more vigorous, robust and generally a better plant type than older varieties.

to be a consistent performer across the UK. I see it as replacing LG Auckland and Ambassador, which we've been staunch supporters of, but which won't be on the RL from this coming year. Adapt is a step up on Limagrain's current offering and sets a new bar for yield."

Adapt has been produced through Limagrain's UK breeding programme where it started life as a cross. According to the company's breeder, Maeve O'Rourke, it stood out from day one as a variety that would be worthy of the lengthy trials process.

"In its first year of National Listing in Lincolnshire it was one of the top performers, so this indicated it was going to be good. Even among similar material it appeared better with heavier pods, and this was something the combine confirmed."

As the name suggests, Adapt is truly adapted to UK conditions, comments Beckii. "This is a reflection of the strength of Limagrain's UK-focused breeding programme. Varieties like Adapt are bred specifically to handle the unique and often challenging environments that British growers face, and it really shows in the results."

As with other Limagrain varieties such as Ambassador and Aurelia, Adapt will be a European-wide variety, adds Ron. "Its suitability to countries and climates across the Continent such as France, Germany and Poland, demonstrate that it's a resilient variety. It has strong winter hardiness and although this is less of an issue in the UK, this could change – we never know when there could be a cold blast."

Having seen Adapt throughout its trials process, Ron says he's found it interesting to observe. "I saw Ambassador and Aurelia come through the ranks but if you compare them with the newer varieties like Adapt, it's clear to see that Adapt is more vigorous and robust and just generally a better plant type."

Adapt has good stem elongation in the autumn but remains compact and doesn't move too quickly, he continues. "This means it's a variety which suits growers who sow early. I'd rather see a compact ideotype that stays closer to the ground going into winter because these types seem to be more resilient if there's snow or frost than something too upright and vigorous."

Adapt is the highest yielding variety on the RL which also has pod shatter resistance, points out Ron. "I don't know why you would grow any OSR without confirmed pod shatter resistance. You're contending with cabbage stem flea beetle, putting money into inputs and then could lose the crop right before harvest because you don't have the security of the pod shatter resistance gene."

But David highlights that the lack of the trait doesn't necessarily mean the pods are going to shatter. "What tends to exacerbate pod shatter is poor late season stem health, which results in the stem drying out and the pods then shatter but newer ▶

New face on the block

Could LG Adapt replace Attica on one Sussex farm?

Having been a fan of Attica for its consistent performance, farmer Tom Luckin was set to grow the variety again for Harvest 2025, but upon ordering seed, was directed towards LG Adapt by United Oilseeds' Beckii Gibbs.

Farming 240ha near Arundel in West Sussex, Tom grows wheat, barley, oilseed rape and some pumpkins. Like many others, he's had challenges with cabbage stem flea beetle and although it's not been such an issue this year, the crop has instead had to contend with pigeons. "Everything that can eat OSR does, and I keep threatening to stop growing it, yet I continue ordering the seed.

"We've returned to using sewage sludge these past two years and this has potentially suppressed the issues from CSFB," he notes. "However, we also delayed sowing until the end of August when we normally go in as early as the end of July, and I think this helped us avoid the pest."

Tom takes a flexible approach to cultivations, doing what's best for the soil and crop at the time. Ahead of Adapt he subsoiled, applied sewage sludge and then drilled the OSR into moist soils using a Väderstad Rapid 600F.

He says the crop grew up and away in the autumn but was unfortunately attacked by slugs. Despite this it came through the winter well, showing good vigour, says Tom. "However, the pigeons did quite a bit of damage and I'd be surprised if some of it ever recovers."

In terms of inputs,

Strong vigour

The West Sussex-based crop of Adapt grew up and away in the autumn but was unfortunately attacked by slugs, despite this it came through the winter well, showing good vigour.

Tom applied AstroKerb (aminopyralid+ propyzamide) in November, has used one fungicide to target phoma and light leaf spot, alongside a trace element dose and has administered a total of 250kgN/ha.

"The crop has produced a good canopy which has meant weeds haven't been much of a burden, and disease had only just started to creep in when we targeted it. But I expect to apply a second fungicide when the petals start to fall," he adds.

Tom has earmarked 40ha for OSR next year and would like to see Adapt achieve around 4t/ha to consider growing it again. "During the years, the biggest influence that's kept me growing the crop is that the varieties keep getting so much more reliable," he notes. "Each new variety seems to offer more and with Limagrain's loaded traits the varieties have really improved."

LG Adapt at a glance

Gross output (% treated controls)	
UK treated	107.8
East/West region	107.8
North region treated	107.6
Oil content, fungicide treated (%)	46.4
Agronomics	
Resistance to lodging	[8]
Stem stiffness	[8]
Earliness of flowering	6.2
Earliness of maturity	4.8
Pod shatter resistance	R
Disease resistance	
Light leaf spot	6.9
Phoma stem canker	5.5
Verticillium	[I]
TuYV	R

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

varieties are proving to have better stem health later into the season. However, many farmers out there will want to grow a variety that has specific resistance and will select Adapt because of this."

As part of Limagrain's drive for strong all-round disease resistance scores, Adapt has good phoma, verticillium and cylindrosporium resistance – although the latter isn't published by AHDB, says Ron. "To avoid stem health issues, it's important for varieties to have resistance to all diseases. And with its phoma resistance, Adapt has the Rlm7 gene which is known to provide good resistance. But we're aware as breeders that it's important to work to bring in additional genes to back this up."

Full UK recommendation

United Oilseeds' Beckii Gibbs is excited to have LG Adapt in the firm's portfolio, noting that it's shown consistently strong performance across the country.

As with most modern varieties, Adapt has TuYV resistance, he adds. "When this was first introduced many years ago, people questioned it but now it's become fairly standard."

According to David, these are traits which the seed trade and growers have come to expect from Limagrain. "Adapt ticks all the boxes for disease resistance and this is combined with its high gross output," he says.

However, it can't be ignored that due in large part to pressure from cabbage stem flea beetle, growers have been cutting back on their OSR hectarage or choosing to not to grow the crop at all. So can new varieties help to bring appeal back to the crop?

"OSR is a very important crop for rotations and I think the wider industry is missing it," argues Ron. "It doesn't make sense to import it from abroad where it's possible neonicotinoids are still being used – we want to see an equal playing field for growers."

This is where Limagrain's establishment scheme can come into play. "There aren't many crops whereby there's a guarantee that if it doesn't grow there's some reimbursement on offer. We're trying to support growers in any way we can to move back into including OSR in their rotation, meaning we're sharing the risk."

Ticking all the boxes

Adapt ticks all the boxes for disease resistance and this is combined with its high gross output, says Agrii's David Leaper.

Plus there are still plenty of growers achieving excellent results with OSR, reminds Beckii. "We'd always recommend choosing a high performing RL variety as these have been tried and tested and bred to give the best possible outcomes."

The target for breeders is to improve varieties, and Ron feels it would be great to offer growers CSFB tolerance or resistance. "We're working hard to see if it's possible to do so, but overall, it's important to keep trying to deliver improved resistance traits. As is evident in our fully-loaded varieties now compared with five or six years ago, there's been a noticeable improvement in performance because we're continually adding and enhancing traits.

"This is why it's so valuable for growers to invest in new varieties and move on from older ones."

Maeve agrees that it's vital breeders continue to work to make OSR more attractive for growers. "We know they want a vigorous crop which can cope with dry conditions and still grow away in the spring, and that has pod shatter resistance so seed isn't lost before harvest. Our aim is to produce varieties that are a good option for growers whether the season is poor or not."

Having worked with OSR for 25 years, David believes new varieties are constantly providing growers with improved potential. "The varieties on offer now are better than they've ever been, but the issues are bigger than ever too. There are still benefits to be had from including OSR in the rotation and Adapt has demonstrated consistency and adaptable performance across regions, giving growers confidence it'll suit most situations."

Unlocking agricultural innovation

Plant breeding has been at the forefront of progression on arable farms since time began. However, new technology could help to accelerate this and bring forward varieties which solve some of the biggest grower and consumer challenges. *CPM* finds out more.

By Charlotte Cunningham

Agriculture stands at a critical juncture – with global population projected to reach 9.7Bn by 2050, the demand for food will increase by an estimated 70%. All the while, climate change threatens traditional farming methods, causing more frequent extreme weather events, reducing crop yields and threatening food security. Arguably, this unprecedented challenge requires revolutionary solutions and precision breeding is emerging from the shadows as a potential game-changer...

To understand precision breeding's significance in modern agriculture, it's important to first recognise the historical journey of agricultural innovation. This is because plant breeding isn't a modern invention, but a practice as old as human civilisation itself. From the moment farming ancestors first selected and replanted seeds with desirable characteristics, the complex process of genetic manipulation began.

Over many generations and during the past century, there have been many key moments which have accelerated – and ultimately led to the development of – precision breeding. This includes early 20th century work by Austrian biologist Gregor Mendel on genetic

Natural progression

Unlike traditional genetic modification which often involves inserting entire genes from different organisms, precision breeding makes targeted modifications which would happen naturally overtime, explains Professor Cristóbal Uauy, of the John Innes Centre.

Project PROBITY

Led by BOFIN, PROBITY is a three-year £2.2M multi-partner project which aims to set up a new farmer-led platform to multiply precision-bred organisms (PBOs) in farmers' fields to provide enough material for batch processing.

inheritance, which – despite being initially overlooked – became the foundation for modern plant breeding.

His experiments with pea plants conducted in the mid-19th century revealed fundamental principles of genetic inheritance that revolutionised agricultural science.

In more recent history, the development of hybrid corn in the 1930s demonstrated how systematic genetic selection could dramatically increase crop productivity. Researchers like Henry Wallace in the US discovered that cross-breeding specific corn varieties could produce offspring with significantly higher yields – a phenomenon now familiarly known among breeders and farmers as hybrid vigour.

Precision breeding, therefore, represents the next evolutionary step in this centuries-long journey. But to truly appreciate its significance, it's important to delve into the intricate scientific mechanisms which make it possible – something which was explored in detail during a recent webinar hosted by the British On-Farm Innovation Network (BOFIN) as part of the PROBITY (Platform to Rate Organisms Bred for Improved Traits and Yield) project.

Led by BOFIN, PROBITY is a three-year £2.2M multi-partner project funded by Defra's Farming Innovation Programme. The aim is to set up a new farmer-led platform to multiply precision-bred organisms (PBOs) in farmers' fields to provide enough material for batch processing.

Looking at this in more detail, the platform is putting in place the infrastructure and process required to take a PBO from less than 1kg of seed to a 100t batch in just three years. Crops will be tested by farmers alongside unedited controls and their farm standard varieties.

Progress in the field will be closely monitored, processed material intensely scrutinised, on-farm practices assessed, and findings will be openly shared. The goal is to explore how farmers feel about growing PBOs and consumers' thoughts about having food made with them.

Professor Cristóbal Uauy, director designate of the John Innes Centre, is one of the project partners and led the conversation, delving into how scientists use precision breeding techniques such as gene editing to develop innovative crop traits, and ▶

Unique position for British agriculture

England is currently the only country to benefit from precision breeding legislation, making it a significant opportunity which could position British agriculture at the cutting edge of global food production, explains Professor Nigel Halford from Rothamsted Research.

▶ the potential benefits this could bring sustainable food and farming.

"A lot of the work we do is trying to understand how plants perform in the field – addressing why we might have yield gaps, for example. But at the same time, we're trying to understand the genetic sequences behind these improvements, and often this comes down to changes in DNA or mutations."

His analogy of wheat DNA as a 3.1M page book for a single variety provides a compelling visualisation. "Imagine a text so vast that if printed, it would create a stack of papers taller than London's most prominent landmarks. Within these millions of pages lie the secrets to crop improvement – but it requires a huge amount of work to identify this."

However, thanks to what Cristóbal described as the 'genome revolution', it's now possible to sequence these genomes, and his work has found that a lot of the changes seen in the field results from tiny differences. "Essentially, all the variation we see in the Recommended List comes down to these small changes in DNA."

Accessing these changes is now being made easier with the gradual introduction of genome editing techniques like CRISPR, which act as molecular scissors capable of making precise changes at specific genetic locations, he explained. "Unlike traditional genetic modification which often involves inserting entire genes from different organisms, precision breeding makes targeted modifications which would happen naturally overtime – albeit incredibly slowly."

To provide context, Cristóbal said a single wheat plant contains approximately 100 natural mutations in each generation, but with traditional breeding techniques it takes around 10-15 years to develop a new variety. This is far too slow to address some of agriculture's rapidly evolving challenges, he said.

"What we're trying to achieve isn't creating something entirely new, we're simply enhancing existing varieties with remarkable precision. In fact, mutations that are generated by genome editing are indistinguishable from those which occur naturally – hence

why there is so much excitement about it," highlighted Cristóbal.

In terms of legislation, anyone au fait with the plant breeding world likely knows it's a highly regulated sector. However, the UK has positioned itself at the forefront of precision breeding regulation with the Genetic Technology (Precision Breeding) Act 2023, which represents a nuanced approach by providing a scientific, streamlined pathway for approving precision-bred crops while maintaining rigorous safety standards.

This legislation is unique in Europe, making England the only place on the continent where such crops can be commercially grown. This is a significant opportunity which could position British agriculture at the cutting edge of global food production, explained Professor Nigel Halford from Rothamsted Research. "Two years ago, the government introduced a change to what was under genetically modified regulations which has allowed us to undertake field trials with genome-edited crops much more simply than before – with a simple notification to Defra.

"That was followed by the 'PBO Act' last year, which introduced the term precision bred organism. This is a genome-edited plant which has no GM element to it. There will be two categories of PBO – one for research only and a second category for marketing. Because we don't know exactly how that's going to work yet, we have secondary legislation which was passed in March and seems to be going ahead."

If all goes according to plan, this will allow genome-edited varieties to enter the marketplace, noted Nigel. And the introduction of these varieties could solve some major challenges for both farmers and consumers, with Nigel's low-acrylamide wheat research exemplifying precision breeding's potential.

"Acrylamide isn't present in wheat grains, or any other crops, but it forms during normal cooking and processing including baking, frying and toasting. It's a highly undesirable chemical to have in your food; it's probably carcinogenic, it's neurotoxic and it affects fertility.

"Of course, it's present in parts per billion levels, but some foods have several 100 parts per billion. Now, we already have regulations on the presence of acrylamide in food that rolled over from the EU at Brexit. So we have benchmark levels which food businesses have to work towards.

"This year it's expected that the EU will set maximum levels which make it illegal to sell a food product if it's above that threshold. So that's a juggernaut coming down the road for the European food industry, and it'll affect the UK supply chain too."

In small scale field trials using genome editing, Nigel explained that researchers have been able to reduce concentrations by up to 90%. "This demonstrates how the technology can simultaneously address agricultural productivity and food safety concerns going forward."

With the technology available and the legislation seemingly in place, all that remains is to get the farming community on board. With some growers scarred from the industry's attempt at dabbling with genetic modification in the past, new technologies such as gene editing are often perceived as highly emotive – which could be due to confusion with what the process actually involves.

However, Yorkshire farmer Paul Temple says if done correctly, they offer a huge amount of potential to the industry. A mixed arable and beef farmer from East Yorkshire, Paul said the approach at Wold Farm is based around a combination of productivity and conservation.

"I was a classic 'farmer sceptic' many years ago, but my driver has always been the application of science. I was fortunate to be involved in field-scale evaluation trials from what I classified as a neutral, sceptical position, and I've learned a huge amount just watching what was happening in the fields with the guys who were running the trials.

> ***"Precision breeding isn't just a possibility – it's becoming a necessity."***

"It made me appreciate breeding, probably for the first time, because I saw both the conventional techniques and a novel approach physically in the field.

"Alongside this, I learned a lot about how this topic is presented in the media and found it hugely frustrating that subjective, unfounded arguments were just laid into objective science."

As a result, Paul became involved in the Global Farming Network which covers 70 countries and looks at how plant breeding is being applied worldwide. "What's really fascinating is that precision breeding isn't just about large-scale farming – it benefits even the smallest of growers by giving them access to the latest technology, regardless of their size."

Centuries long journey

The journey to precision breeding spans over many generations: from the moment farming ancestors first selected and replanted seeds with desirable characteristics, the complex process of genetic manipulation began.

To facilitate better discussion between farmers and the wider industry, the PROBITY project has set up 'The Sequence Circle' – a community of farmers established to drive discussion and steer the project. Part of this is a moderated Knowledge Cluster – a discussion forum with resource hub – which launched last autumn and aims to build to at least 300 farmers, scientists, plant-breeding representatives and other industry innovators, who lead the conversation on precision-bred crops and trade knowledge on how to progress the technology.

"This technology isn't about eliminating choice but rather providing farmers with more sophisticated tools to address complex agricultural challenges," concludes Paul. "As we look to feed a growing global population in an era of unprecedented environmental change, challenges to yield and issues with finding molecular chemical solutions, precision breeding isn't just a possibility – it's becoming a necessity." ●

Taking soils into account

Researchers are suggesting plant breeders and variety certification agencies pay too little attention to soil conditions, potentially resulting in varieties which may not be fit for purpose. *CPM* puts their case to the UK seed industry.

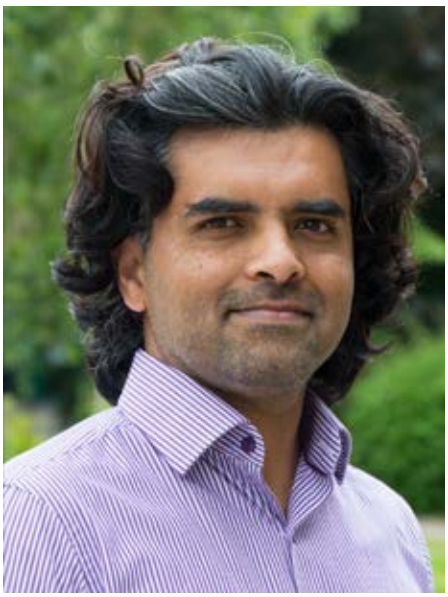
By Mike Saull

A multidisciplinary team of researchers is urging plant breeders and testing bodies to revise breeding programmes to consider soil characteristics when selecting new varieties for planting on farm.

Their data – published in the journal *Nature Plants* – suggests cereal testing currently uses a 'one-size-fits-all' soil environment. They say this pays scant attention to the capacity of new genotypes to deliver optimal yield under the increased stresses faced from the rapidly evolving dynamics of UK soils.

According to Dr Sajjad Raza from the University of Nottingham, who led on this research undertaken as part of the BBSRC 'Delivering sustainable wheat project', soil conditions are becoming increasingly diverse.

"Higher temperatures, changing rainfall patterns and an increased frequency of extreme weather events due to climate change are exacerbating soil stresses," he says. "To protect soils, future management must prioritise soil conservation, primarily through the adoption of sustainable agricultural practices.



Cross-industry disconnect

According to Dr Sajjad Raza, the disconnect between breeding activities and soil science also extends to seed certification agencies.

"Reduced or no tillage techniques, cover cropping, and residue retention will lead to future soils which are more variable in structure because many of the processes involved are more biologically driven."

Sajjad highlights that the dynamic nature of key soil properties and their potential effect on plant yield raises several important questions for crop breeders and soil scientists, including whether modern cultivars can achieve high yields under changing soil conditions.

"In our view, plant breeding research may have to pivot, to test genotypes under a wider range of contrasting soil conditions including those observed under sustainable agriculture management such as reduced and zero tillage, which often leads to harder soils," he adds.

As part of the team which includes scientists from Rothamsted Research and the John Innes Centre, Sajjad and colleagues conducted an extensive bibliometric analysis to assess global research on plant breeding and its proportional focus on soils and their physical properties.

The evidence, based on more than 650,000 published papers, suggests 90% of the authors undertaking plant breeding-related research hadn't considered the effect of soils.

This ratio was even lower when it came to testing plant genotypes under variable soil physical properties, with only around 1% of papers mentioning testing cultivars under contrasting soil physical properties such as bulk density or soil texture.

Sajjad suggests this disconnect between breeding activities and soil science also extends to seed certification agencies. "To be certified, new genotypes undergo mandatory statutory testing processes to ensure their distinctiveness, uniformity and stability.

"However, none of the seed certification agencies worldwide have any defined protocols to test the performance of new varieties under variable soil conditions.

"From the publications we explored, breeding trials are mainly conducted on high-yielding soils and prioritise traits such as yield and disease resistance," he continues. "Consequently, breeding lines become varieties based on tests on a limited range of soil types which can lead to a strong bias towards those with high-yield potential."

Sajjad believes that the longstanding disconnect between soil science and plant breeding arises from a combination of historical, institutional and practical factors which have hindered collaborative efforts.

"Going forward, this disengagement between plant breeding and soil science leaves open major questions about whether modern cultivars can achieve potential yields under contrasting and changing, future soil physical or tillage conditions.

"While higher temperatures due to global warming might positively influence soil microbe activity and speed up the breakdown of organic matter, they also increase moisture loss from the soil, thereby restricting soil potential and future variety performance."

POLICY PRIORITIES

He points out that policy makers are backing moves to increase the retention of organic carbon and so encourage better soil health on farms – this includes restricting soil cultivation.

"Ever since we started more intensive agricultural activity in 1960s, we've lost a huge amount of carbon from soils. Moving to reducing tillage and the use of cover crops, and so on, will help to stem this loss."

Sajjad adds that early research as part of this project confirms that soils are denser and less porous in reduced tillage system, while soils which are loosened prior to drilling are more porous, but less stable.

> ***"I'm not sure just how relevant a worldwide desktop study is to more fertile, high-yielding countries in the world such as the UK."***

"Some studies also show that zero tillage can boost soil organic matter and reduce greenhouse gas emissions and if we move from a current global estimate of 12% of agricultural land under these systems to a much higher level, then do we have seeds which can cope?" he queries.

While accepting that soils are extremely variable and increasingly heterogeneous in nature, Sajjad proposes that the industry could do more to test the ability of new varieties under different soil conditions.

Testing regimes

Despite the findings in the study, KWS' Mark Dodds, says UK cereal varieties are currently tested in a range of soil types across the length and breadth of the country.

"We can now use techniques such as high-resolution soil mapping and monitoring systems to capture spatial variations in bulk density and soil texture. Given that soil texture influences water availability, this data can guide the development of genotypes tailored to specific soil types to ensure optimal yields across diverse environments."

In addition, in much the same way hospitals use CT-scanners to assess hidden tissues and organs in humans, techniques such as X-ray Computed Tomography imaging can be used to monitor root growth under different soil conditions such as texture, structure and bulk density, without having to disturb the soil or crop.

These insights could then be directly integrated into breeding pipelines to select genotypes with desirable root traits for specific soil conditions, ultimately improving crop resilience and yield under diverse soil environments.

Sajjad explains: "It's likely some breeders are already undertaking testing across a range of soil conditions, but the published literature suggests this is limited. It's vital that varieties growing in future soils can thrive under a range of conditions where nutrient and water acquisition is likely to be more challenging."

Despite the findings in the study, KWS wheat breeder, Mark Dodds, says UK cereal varieties are currently tested in a range of soil types across the length and breadth of the country.

"These are robust tests and only the best, most consistent, varieties are ▶

recommended after three seasons. Comparisons across soil type and texture play a part in this process and these details are highlighted through the Recommended List.

"However, to go further and increase moisture loss from the soil thereby restricts soil potential and future variety performance," he suggests.

Mark points out that a key part of variety testing is ensuring all plots and replicates are grown in homogeneous conditions including an even seedbed for consistent emergence.

"Our trials indicate this isn't easy to achieve in a reduced cultivation or min-till situation resulting in considerable variation between plots and replicates, making real varietal performance differences difficult to judge."

Even so, Mark acknowledges that assessing varieties in more difficult structured soils in extreme conditions elsewhere in the world – for example, sub-Saharan Africa – could well be more pertinent. "I'm not sure just how relevant a worldwide desktop study is to more fertile, high-yielding countries in the world such as the UK."

Niab research lead, Dr Stéphanie Swarbreck, agrees that changing farming practises such as reduced application of fertiliser and reduced tillage are likely to exacerbate soil differences and it's sensible that these are considered when developing and assessing varieties. However, there's no simple fix.

"Our geneticists, physiologists and soil scientists are looking to better understand how different practises affect the performance of commercial cereal varieties as well as pre-breeding genetic material.

"This includes a project looking at variety traits for regenerative agriculture, funded by The Morley Agricultural Foundation and a new multi-partner project, funded by the Novo Nordisk Foundation, to explore interactions between diverse wheat material and the soil microbiome."

Current work

Project work at Niab aims to identify the traits which are underpinning performance under varied soil conditions, says the institute's Phil Howell.

Influencing factors

Stéphanie Swarbreck says Niab's geneticists, physiologists and soil scientists are looking to better understand how different practises affect the performance of commercial cereal varieties as well as pre-breeding genetic material.

UNTAPPED POTENTIAL

According to Niab's Dr Phil Howell, this will tap into thousands of the institute's pre-breeding lines developed variously from large multi-parent populations; including material with altered root morphologies.

"This work is important to identify the traits which are underpinning performance under varied soil conditions. However, the number of lines that can be tested even under these conditions, is limited."

Niab is also investigating whether it might be possible to screen for some of these traits earlier in the selection process, when there's the greatest potential for genetic improvement.

For example, BBSRC has funded the construction of a seed drill which can plant the small plots required by researchers and breeders for early generation testing – when the number of lines to test is high but the seed quantities available are low, into minimum tillage seedbeds.

Niab's head of agricultural crop characterisation, Dr Margaret Wallace, believes the current variety registration and seed certification systems don't take wider interactions with the soil into consideration. However, by taking root assessments as an example, it's difficult to see how robust, repeatable and fair procedures can be integrated into these statutory testing systems without introducing significant costs, she says.

"The criticism that breeders are developing 'one-size fits-all' varieties isn't only a result of the current testing system, but also of the desire of growers to see relatively few varieties on the RL, and the high costs and complexities of running efficient breeding programmes," explains Margaret.

"Each year, commercial plant breeders will typically screen hundreds of thousands of plants in the field, from hundreds of new genetic combinations, with each individual plant potentially representing a unique new variety.

"At this scale it's simply not possible to carry out complex and detailed screening. Material selected in early generations will then be retested at multiple locations, over multiple years, across different microclimates and soil types, before the breeders enter their best candidates into official trials."

In conclusion, Margaret says the cost of first developing and then maintaining a suite of several varieties, each adapted to specific environments and soil types, is likely to quickly outweigh the relatively modest royalty income that new varieties generate. ●

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Moving up a gear with arable maize

With increasing pressure on input costs plus a drive to find effective break crops and therefore reap the benefits of more diversified markets, UK arable growers continue to turn to maize. *CPM* weighs up the differences between crimped and dried.

By Rob Jones

For many arable farmers, grain maize aligns closely with their mindset and existing infrastructure, offering a relatively straightforward crop to grow compared with many alternatives plus offering a range of marketing options.

The growing number of AD plants in the UK present an obvious home, but with an increasing number of marketing contracts available for grain maize, many producers are looking at the crop and pondering which of the two options – crimped or dried – best fits their system.

One grower who's fully embraced the potential of crimped grain maize is Warwickshire-based farmer and contractor Tim Sansome. With 12 years' experience of growing the crop, he's seen crimped maize evolve from a niche alternative to the foundation of his rotation at Little Chase Farm in Kenilworth.

"What started as an alternative break crop has grown to the point where maize is now our main crop, with up to 160ha grown every year compared with a wheat area of around 40ha," he explains.

"While a small proportion is grown for silage, the majority is for grain maize with around 80% being crimped and the rest dried depending on the season and whether it's a viable option."

VARIETY SELECTION

Tim says choosing the right variety has been key to ensuring maize can be harvested in good time as well as delivering the yields required to produce the necessary financial returns.

Important variety considerations include maximising output and ensuring crops stand strong for late season combining, with crimped maize presenting a lower-energy alternative to drying, with high feed value for local livestock farms.

"We prefer a reasonably early variety as we require the reassurance it'll harvest in good time when there's a cereal following, but not at the sacrifice of yield.

"Consistency across seasons and different growing conditions certainly trumps our desire for high

Improving profitability

According to farmer Tim Sansome, with grain maize inputs being much less than those of wheat, he's confident he'll see improving returns in the future.

Leading the rotation

Rather than being just a break crop, grain maize has now become a main crop for Leicestershire-based Will Oliver.

yield potential. Harvest is later than for forage maize, so stem stiffness is also key to avoid it collapsing."

Varieties he's grown in the past have been Like-it and Agriaxx, whereas Micheleen and Crosbey are now showing great promise.

"Micheleen is the one that's stood out - its cob development is slightly slower than some varieties but when it gets to the milky grain stage it develops quickly, although harvest time can be a little later. But, the yields are noticeably higher and this has been the case for several years now.

"Even in the difficult conditions of last year, it finished on time with a high yield so really does seem to have the balance of yield, maturity and consistency which is so crucial."

Tim adds that its good starch content and cob ripeness make it an ideal variety for grain maize when grown on good sites or established under film. "This is with a recommended seed rate of 99,000 to 105,000 seeds/ha (36,000 to 42,500 seeds per acre) to maximise its output.

"All the maize is drilled with DAP starter fertiliser down the spout with 250kg/ha (2cwt/acre) of urea in the seedbed."

At harvest, the grain from the combine is taken by trailers to an old forager used for the crimping process which blows the finished product straight into a large clamp, he points out.

"There are enough local dairy and beef customers in the area to keep us busy and we've supplied some to AD plants too. People take it 15-20t at a time because it's a moist feed and has to be used relatively quickly compared with dried maize.

"Price-wise, grain maize tends to follow the feed wheat grain price with a little influence from barley. But the inputs are much less than with wheat, so I'm confident we'll see improving returns in the future, particularly if we experience something like a nitrogen tax. It's a crop we have a lot of confidence in."

While crimped maize offers a flexible, on-farm feed option with minimal processing, others are maximising the crop's potential through dried grain maize – tapping into premium markets and managing it like any other high-value arable crop.

One such grower is Maize Growers' Association (MGA) council member Will Oliver of AH Oliver & Sons in Leicestershire, who's made dried grain maize a key part of his spring rotation, backed by careful agronomic planning, nutrient recycling from broiler muck, and attention to grain quality at harvest.

IMPRESSIVE DEBUT

After looking for a spring crop which would make best use of the 2000t of manure from the business' broiler sheds each year, their first grain maize crop in 2020 immediately impressed with the results, he recalls.

"The gross margin matched our best first wheats that year – £1365/ha, with a dry yield of 9.51t/ha at 15% moisture. That was a lightbulb moment, and we dropped oilseed rape from the rotation not long after.

"Maize now occupies around a quarter of the farm's 800ha, grown in rotation with wheat and beans."

In the spring, ahead of drilling, fields are spread with chicken muck at 6t/ha or sewage sludge at 18t/ha to provide a nutrient-rich base. "We spread it carefully using a weighbridge system to make sure it's accurate," notes Will.

Cover crops of rye and vetch are grazed twice annually by a local farmer's sheep to manage biomass and improve soil condition, and the maize is drilled with a contractor using a Väderstad Tempo at around 89,000 seeds/ha.

"We started at 110,000 seeds/ha but we've learned that with grain maize, we want less canopy and bigger cobs – it's a density game," he says.

Early nutrition is supported with 100kg/ha of DAP, and post-drilling, molasses-based QLF Boost is applied. "I'm trialling a handheld chlorophyll sensor to guide nitrogen applications. I don't just leave the maize to get on with it – I'm always looking at how to tweak things."

Harvest takes place in mid-October and everything is dried on-farm, usually coming off the field at 32% and then being dried down to 15%.

"We dry 24/7 and it's not without its challenges –it costs around £18.90/t in diesel and is labour intensive," admits Will. "But the market makes it worth it; we're typically targeting £200/t which gives us a premium over wheat."

Sticking to early, stiff-stemmed varieties which combine well is crucial for his system. He says ES Constance has emerged as a standout performer, yielding 8.44t/ha in 2024 and achieving a gross margin of £1386/ha.

"Constance has really proved itself being the highest yielder on the farm and stands brilliantly. It's a group 8, mid-season variety offering lots of mature grain which translates into excellent levels of metabolisable energy and starch to produce excellent grain crops, particularly when crimped."

Grain maize is also helping with rotation flexibility and improving timeliness for following crops, he adds. "We don't harvest unless we know we can drill wheat the same day, and because maize leaves a clean stubble and the trash is chopped back in, it makes a great seedbed. You don't even have to use a pre-emergence herbicide."

For Will, dried grain maize has become a key part of his system helping to prioritise soil health, nutrient recycling, and profitability. "It's not just a break crop – it's a main crop now. And as long as we're getting margins like this, it's going to stay that way," he concludes.

Thinking ahead

Variety selection is key to ensure maize matures in a timely manner for harvest.

Why the Black Sea matters

Although the UK doesn't import much wheat, its prices are influenced by global markets all the same. *CPM* examines why understanding Black Sea wheat production is so important and how this information can be used to make informed marketing decisions.

By Melanie Jenkins

The Black Sea may have become synonymous with the war between Ukraine and Russia, but for any grower wishing to market their grain it's important to never lose sight of its significance as a huge exporter of wheat, and to an extent, maize.

That's according to Green Square Agro Consulting's Mike Lee, who says Russia is the number one exporter of wheat in the world, while Ukraine is sixth. "To put this in perspective, Moldova, a little talked about and poor post-Soviet country is twelfth and the UK is twentieth, which is why UK prices are at the mercy of wheat exports from the Black Sea."

However, it goes without saying that there's much geopolitical upheaval in the area at the moment, he notes. "But even before the war there was a lot of misunderstanding about Black Sea grain production and its impact domestically."

Mike has made a career from putting boots on the ground in Ukraine and Russia so that crops can be assessed accurately to produce yield forecasts, providing markets with real-time information to allow growers and traders to make informed decisions when buying and selling.

MISCONCEPTIONS

"There's a fairly widespread and inaccurate belief that Ukrainian and Russian farmers are backwards, which leads to the assumption that the wheat originating from these areas is 'cheap'," he comments.

"But the reality is that what they're producing is as good as what we grow in the UK, so rather than being cheap wheat, it's competitively priced. If you were to stand in one of their fields now you'd be forgiven for mistaking the location for Lincolnshire or Cambridgeshire – they're producing high quality crops, and this is only going to continue."

He highlights that reframing Black

Accurate yield forecasts

Green Square Agro Consulting's Mike Lee has made a career from putting boots on the ground in Ukraine and Russia so that crops can be assessed accurately to produce yield forecasts.

A trained eye
Because of the longer, colder winter conditions experienced in the Black Sea it takes an informed eye to be able to accurately evaluate a crop.

Sea wheat as a competitive product is the first step to better understanding the grain markets and subsequently how this information can be used when managing UK farm businesses.

"The capability of Ukrainian and Russian farmers is constantly increasing, as are their yields, which ties into their competitiveness with UK farmers," explains Mike. "Their inputs may be similarly priced to the UK, but the cost of overheads such as land and machinery are significantly lower, so immediately there's a competitive advantage.

"Top arable land can sell for well over £20,000/ha here but in Ukraine a long-term lease can be sourced for as little as £1000/ha, which means you're dealing with an uneven playing field from the start."

Wheat production out of the Black Sea has also been increasing steadily for the past 10-15 years, observes Mike. "There's been an increase in area and yields per hectare, with Ukraine almost doubling its average yield from 2t/ha to around 4t/ha. I understand this might not seem much compared with the UK average of 8t/ha, but when you consider Ukrainian farmers are achieving this with minimal inputs, you can't compare the two."

And in the UK, farmers are pushing to make every hectare produce more because of the combined cost of land, machinery, seed, fertiliser, sprays, labour and more, he says. "We're in a position where we have to squeeze as much out of our area as possible. In contrast, Ukraine and Russia don't have this pressure. Although science suggests we could achieve 20t/ha, we seem to have plateaued and are limited by our agronomic understanding."

GEOGRAPHICAL VARIATION

Ukraine, by and large, has a fairly uniform geography and environment while Russia consists of several different grain producing zones, explains Mike. "There's a lot of winter wheat produced in the southern and central areas, but the south is often hot and yields vary while the centre has a more stable climate and yield output.

"In the east on the other hand, more spring wheat is produced and this area is quite volatile. Despite the variations across the grain regions of Russia, it tends to even out each season with one area performing well while another has lower yields, which in essence ▶

helps to limit Russia's overall production."

But what Russia has that the UK doesn't have, is more land, he reminds. "Russia still has a lot of land that can be expanded into for arable production. To give this context, during the past 10 years Russia has increased its wheat growing area by around 3M hectares.

"So although Ukraine's wheat production has fallen from 30M tonnes to 20M tonnes during the war, the overall wheat production out of the Black Sea has remained the same, with Russia's output balancing the sheet."

And while Ukraine doesn't have swathes of unfarmed land to expand into, it still has scope to significantly increase yields, believes Mike. "So there's a lot of low-hanging fruit for both countries to improve productivity, and I think in the medium-to-long term, we'll see more competitively priced Black Sea wheat entering the market."

For a period at the start of the war, exports out of the Black Sea were hindered but this is no longer the case with both counties exporting recording volumes during the past year, he adds.

But unlike the UK, Ukraine doesn't benefit from a Recommended List, instead there are around 100 varieties for use via plant breeders' catalogues. "And although this seems like a lot of options, more doesn't necessarily mean better. In addition, when buying grain from Ukraine, it's harder to know what variety is being purchased because the system isn't as transparent as in the UK."

And because UK growers don't have the scope to expand or increase yields in the way Black Sea farmers can, drilling into costs may be the best approach to improve margins and increase competitiveness, he says. "This is easier said than done and the approach will depend on the individual business."

Informed decisions

Understanding Black Sea wheat exports can help farmers to make informed decisions on how to market their grain.

FIRST-HAND EXPERIENCE

"Previously I ran farms in Ukraine, and we'd have private investors promise money to the business. We'd set up the business based on this investment and then only half the money would arrive, which really focuses the mind because you're running your business with no money. It helped us to drill down into the essentials and to only purchase what was absolutely necessary.

"What really struck me upon my return to the UK was the volume of expensive tractors on farms, and although these may be the most cost-effective machine for some farmers, in other cases a more affordable model could do the same job. It could be a case of compromise because any decision may impact your efficiency or yield."

Mike also suggests farming the land with the resources and value available. "If you're continuing to chase yield and are still losing money, then it might be time to evaluate alternative options.

"On a wider scale, what UK farmers require is a government policy and social mechanisms that support them. It all goes hand-in-hand with the inheritance tax issue, whereby the price of land has been decoupled from the ability to produce a crop on it."

So why does real-time monitoring of crops thousands of miles away matter? Despite the swathe of remote monitoring equipment at the disposal of the markets, he points out that an in-person visual assessment of a crop often tells a different story.

However, the war has hindered the firm's ability to visit many of the key locations it would have travelled to before. "Prior to the war, we'd have visited Ukraine and Russia as many as six times per year, travelling through areas where issues with grain had been reported on remotely. My approach has been to go there in person to be able to say with certainty the state of the crops."

Mike says he often found that remote sensing data from satellites would almost always report crops to be in a worse state than they actually were. "We'd arrive in these regions to find there was

Matching quality

The wheat produced in the Black Sea is as good as what's grown in the UK.

nothing wrong with the crops at all, so it's very frustrating to not be able to carry out in-person visits at the moment."

The reason first-person data is so valuable isn't just because of the lack of reliable remote data, but also because of the vested interest of those buying and selling grain, he points out. "As soon as there's two weeks of dry weather, there'll be those reporting that crops are dying; trade is constantly fluctuating on the current weather. So by providing a transparent first-hand view of crop status, this helps to bypass the market panic, as well as the lack of reliable information that can come out of the region."

He also highlights that because of the longer, colder winter conditions experienced in the Black Sea, it takes an informed eye to be able to accurately evaluate a crop. "What looks good can be subjective to a particular area, so this has to be contextualised."

At present, the firm is using both remote data and backing this up with anecdotal data from local sources with boots on the ground. "For the coming harvest, the yield potential out of the Black Sea looks positive, which could put pressure on UK prices."

Although the UK doesn't import much wheat, any wheat exported onto the world market from the Black Sea impacts the global price which concertinas back to what price UK farmers can command, explains Mike. "Understanding the competition is the first step to preparing your own business.

"If you were to plot the average price of UK wheat against the wheat yields coming out of the Black Sea, you'd see there's a correlation between increasing yields and decreasing UK price," he says. "But remember, this works both ways. So following Black Sea wheat potential can provide you with an indication of what the home markets are likely to do in the coming year."

Combines usually start to roll in Ukraine and Russia between the middle and end of July, and as soon as they're in the field, this will give a good indication of what the real yield potential out of the Black Sea will be, adds Mike.

> ***"It'll be down to compromise because any decision could impact your efficiency or yield."***

KNOWLEDGE TRANSFER

So how can UK growers access this information? Firms like Mike's are one option and as soon as the war ends, he stresses he'll have boots back on the ground in both Russia and Ukraine. "If you have little experience of understanding grain markets first-hand, coming in cold can be quite overwhelming but it's a lot simpler than it may seem.

"There's plenty of remote information available and you can make a good assessment based on that. For instance, AHDB publishes a regular market update that's usually only a page long, so you can read those for an overview.

"Social media can also be a great tool for keeping up to date with grain analysts and even befriending locals who you can engage with for insights on a regular basis," he advises. "It can be a great way of connecting with other farmers and can provide real value."

He concludes by stating knowledge is power. "But if you're making decisions without knowledge then you're rolling the dice. And while monitoring the market won't give you a definitive answer, it'll help you make the least worst choice.

"Plus, knowing the market well means you're likely to become more adept at picking up on long-term trends – black swan events like the war aside – and alongside your yield forecasts can help you to determine your range of return."

A funnel of R&D dissemination

From collaborating with European partners on big ticket topics through to individual glasshouse proof of concept experiments, ensuring UK growers have access to the latest technologies and relevant innovation has become integral to the delivery of Hutchinsons' R&D focus. *CPM* finds out more.

By Janine Adamson

Research and development – mostly known as R&D – operates at a multitude of levels, particularly when it comes to the adoption of new technologies. It can present itself as a global-scale multi-million pound project, but it can also involve a sole laboratory experiment.

Although for those at the creation side of proceedings, innovation is often thrilling and laden with potential, on the other hand, it's relatively meaningless unless it presents a viable solution to a real-life problem experienced by an end-user. In this case, the farmer.

Bridging the gap between innovation and on-farm adoption has arguably become a role for agronomy companies and their technical experts, who act as a screen for new technologies. However, Hutchinsons aims to take that a step further – developing an R&D funnel approach whereby the scope starts at an international level, drilling down through the layers to strip trials and individual pot experiments.

Furthermore, regardless of the scale of the work or innovation in question, Hutchinsons believes it's part of its role to understand the 'so what?' – to answer why it's of relevance to UK farm businesses and whether it truly presents a viable solution for the industry.

R&D DISSEMINATION

"Recognising innovation comes in many forms, we aim to showcase and disseminate the breadth of R&D that we're involved with throughout the market, whether that's traditional crop protection products and services, or alternative solutions," explains development manager, Jennie Watson.

"We achieve this through a range of approaches – from glasshouse proof of concept work and small-scale plot trials through to our network of Regional Trial Centres and Helix farms. Then beyond this, we collaborate at a European level to help identify commonalities and share best practice.

Meaningful insights
Hutchinsons' Jennie Watson says the company has a multi-faceted strategy where it aims to crystallise research and new ways of thinking into something meaningful for UK growers.

"It's a multi-faceted strategy where we aim to crystallise that research and those new ways of thinking into something truly meaningful for UK growers," she says.

Hutchinsons' relationship with Novafield Alliance – a collaboration of agricultural distributors, cooperatives, unions and private retailers across 14 countries – began in 2008. The purpose was to develop a two-way association where learning through differences is as important as understanding similarities.

In February, Hutchinsons hosted Novafield's technical team at its blackgrass management site at Cambourne in Cambridge. Jennie says discussions centred around the field-scale trials at the farm which investigate the impact of cultivations, placement fertilisers, drainage, soil management and herbicide programmes on weed control.

Although not yet registered in Europe, Hutchinsons was also able to demonstrate the performance of new UK herbicide active ingredients cinmethylin (Luximo) and bixlozone (Isoflex). "With Europe having voted to revoke flufenacet and its UK future looking uncertain, Novafield's visit proved an opportune moment to share learnings related to both cultural control and herbicide use," comments Jennie.

"From our perspective, we could also benefit from understanding the

Access to new innovation

Hutchinsons' relationship with Ecorobotix – a precision spot sprayer from Switzerland – is the result of the collaboration with Novafield, highlights technical director, Stuart Hill.

Forging ahead as a Helix farm

On-farm benefits from being a part of the Helix project

With five years of Hutchinsons' Helix project under his belt, Yorkshire farmer Nick Wilson says he's used the opportunity to take his business to the next level.

Based in the Vale of York with 260ha across three varied units, the main site, Hundayfield Farm, plays host to Helix. Soils here are mostly free-draining sandy loams and the farm's rotation involves winter wheat, spring barley, grassland, fodder beet, spring wheat and oilseed rape, with a small area rented out for potato production.

Nick says his involvement with Helix started during a conversation with agronomist Sam Hugill, where they discussed the farm hosting trials for Hutchinsons. With Nick being willing to engage with new technologies as well as the wider industry, he proved an ideal candidate.

"The main incentive was being able to take our farming a step further – using technology and trial work to gain a greater understanding so we could calibrate our actions and be involved at a deeper level," explains Nick.

"Access to this depth of insight has been excellent and we've learnt so much. Ultimately, it validates what we're doing and means we can compare with others in the Helix project."

The first trial the farm undertook investigated cover crop establishment using different drill set ups, but that's been the tip of the iceberg, he says. Since then, Nick has been involved with an NUE experiment to evaluate alternative sources of nitrogen, looked at varietal blends and hybrid wheat options, rolled out TerraMap and each guise of the Omnia farm management software, and is now part of the Messium pilot (see main story).

According to Sam, the magic has been Nick's willingness to engage with innovative solutions and approaches. "For example, Nick was already undertaking tissue and soil testing, but we've been able to work together to take that up a gear.

"He's certainly in the early adopter category, and it's even better that he wants to share the farm's learnings for the greater good of the industry," comments Sam.

Nick adds that one of the highlights so far has been contributing to Omnia's development. "We've grown with it as it's evolved and now it's a fully-encompassed tool for farm management. It's proven hugely helpful as a way to track responses to the actions we're undertaking on the farm; monitoring and recording data so we can benchmark and compare."

Whether it's yield mapping, variable rate seed or SAP testing, each year introduces new techniques and approaches to crop management, highlights Nick. "The main driver is to improve the farm, but equally it's about contributing to the wider industry to help propel it forward."

Sam agrees: "We want these types of farms who are proactive and industry leaders. Then it's a case of working together, introducing new ideas and sharing the resulting narrative," he concludes.

Perfect partnership

According to agronomist Sam Hugill (L), Nick Wilson (R) is an early adopter, made even better by the fact he wants to share the farm's learnings for the greater good of the industry.

new innovation being launched in many European countries as a result of significant pressure to reduce inputs and focus on water quality."

Novafield Alliance meets around three times a year with recent discussion topics including disease management, in particular late blight control in potato crops, the use of varietal blends, and alternative sources of nitrogen.

Meetings also facilitate improving access to new technologies. "Our relationship with Ecorobotix – a precision spot sprayer from Switzerland – is the result of our collaboration with Novafield," highlights technical director, Stuart Hill.

"Because precision application is a highly important and common topic within Novafield, it meant we could access an Ecorobotix machine to demonstrate the benefits to UK growers. In return, we've been sharing findings from our relationships with SMEs such as Messium, PES and Elaniti."

Hutchinsons' work with innovators, agri-tech businesses and SMEs is primarily delivered through its Helix project – a growing network of farms that evaluate technology and data on a field-scale to support on-farm decision making.

HELIX LAUNCH

First conceptualised in 2017, Helix was officially launched a year later when Andrew Pitts of Moat Farm in Northamptonshire became its first host. Now, with soon-to-be eight farms on board, Stuart says it's evolved to focus on tailoring R&D work to each grower's future goals and ambitions.

"We're all being exposed to a plethora of technologies such as data analytics, climate systems, machine learning, sensors, monitoring and detection systems, autonomy and robotics. However, there's a demand to evaluate which of these innovations are relevant and will ultimately increase productivity and profitability, as well as efficiency, both for the grower and the agronomist.

"We have to be able to rationalise these technologies into a benefit for the grower and screen their viability, which is where Helix comes in."

And not all technologies make it through to the other side during the Helix process, highlights Jennie. "We have to be open – not everything will work on farm because it either fits into the research arena, or doesn't work from a practical perspective.

"However, TerraMap – Hutchinsons' soil mapping system – is a tool which has successfully been screened by the Helix project. Equally, Omnia and its recent update was piloted using our Helix farms."

A concept which has recently caught the imagination of the industry is Messium's precision nitrogen service which is based on hyperspectral imaging and satellite technology. Hutchinsons is a partner on an Innovate UK-funded project to ground-truth Messium's technology using Helix farms.

PES Technologies is another agri-tech company which is working with the Helix project, this time to assess its new hand-held soil testing device.

Then, from an even more applied perspective, Hutchinsons has its Regional Trials Centres (RTCs) which host practical field work across the country. The nine farms act as regional demonstration sites to evaluate aspects such as variety choice, with activity overseen by independent contractors.

This year, the RTCs are investigating a broader, integrated theme: 'Strategies for success', explains Stuart. "This includes looking at the influence of environmental concerns, utilising digital tools such as Omnia , the role of soils and cultivation methods, optimising nutrition and finally grassweed control."

He adds that to disseminate learnings from the RTCs, Hutchinsons invites its growers to a series of summer open days and engagement opportunities. "This is in addition to open days for our potato demonstration farm, specialist cropping sites and environmental site," says Stuart.

At an individual product level, smaller scale R&D work takes place using plot trials and glasshouse proof of concept experiments. This might include initial pot studies to evaluate the performance of a specific biostimulant product, for example, says Jennie.

"This type of screening work occurs prior to replicated field work, which is where we confirm a product's actual performance."

According to Jennie, the strength of Hutchinsons' R&D work lies in offering a breadth of provision, working across the entire rotation and for a range of different system approaches. "And by collaborating across themes and identifying synergies, we can establish a holistic approach to crop management with joined up thinking."

To conclude, Stuart stresses the importance of relationships: "We can't operate in isolation, we have to work together whether that's at a global, European or local level. Furthermore, by weaving technology into the mix, we have the ability to maximise the latest innovation, but without borders." ●

International collaboration
Novafield Alliance meets around three times a year, including visiting Hutchinsons' trial sites.

Innovation Insight

Hutchinsons remains committed to investing in a broad range of R&D activities, whether that's disseminating the latest insights from Europe, right through to sharing the data from an individual UK glasshouse trial.

All the while, the aim is to ensure the innovation pipeline is relevant to UK farming businesses and the challenges they face on a daily basis.

Central to Hutchinsons' R&D is the Helix project which strives to align new and old technologies, evolving and developing them to improve crop management decisions. This also includes a network of Helix farms – a diverse group of growers who contribute to the development and testing of these technologies across different regions, climates, and challenges.

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

For more information about open days at Helix sites and RTCs visit www.hutchinsons.co.uk/event/

HUTCHINSONS
Crop Production Specialists

A fast-tracked connection to the future

Could private networks lay the groundwork for the connected farms of the future by demonstrating the transformative power of technology? *CPM* visits the Overbury Estates, where 4G and 5G-based solutions are being trialled to help improve farm efficiency.

By Janine Adamson

Historically, if you invited farmers to share a list of their key asks, a reliable internet connection with faster download speeds would undoubtedly be close to the top. This is because in a rapidly-accelerating digital world, those in the most rural UK communities have often felt left behind when it comes to accessing online services and internet-reliant solutions.

However, that could be about to change thanks to a government-funded project which aims to showcase the benefits of using 5G private networks in agriculture.

It involves a collaboration between Virgin Media O2 Business and River Severn Advanced Wireless Innovation Region (RSPAWIR), where a 4G/5G private network has been installed at Cotswolds-based Overbury Estates, demonstrating how enhanced connectivity can boost crop production and environmental preservation.

Selected due to its high standards of environmental stewardship, Overbury Estates is acting as a testbed – utilising 4 and 5G to power technologies such as AI-trained camera traps, fertiliser monitors, weather forecasting and real-time data analytics.

SECURE WIRELESS NETWORK

But what is a private network? In the simplest terms, it's a dedicated and secure wireless network installed within a specific enterprise to offer high speed, low latency, and reliable connectivity. Perhaps important to note, is that it operates independently of public carrier networks therefore can only be accessed by individuals with a specific, authorised sim card.

By installing wireless radio antennas and other transmission resources, it's possible to open up a range of use cases, as being demonstrated through the project at Overbury Estates.

"Our objective is to connect the entire farm with 5G technology, although we're using a hybrid 4G/5G solution," explains Stephen Sargood of Virgin Media O2 Business.

Digital twin

According to Stephen Sargood, the end goal is to create a digital twin of Overbury Farms with everything available through one dashboard.

Government funding opportunities for tech and innovation

As revealed by Steve Reed, secretary of state for environment, food and rural affairs, there'll be new opportunities to apply for productivity grants this coming year

In the wake of the closure of SFI, UK agriculture is being given the opportunity to apply for government funding for equipment, technology and innovation, with some schemes open now.

Launched on 28 April is the Accelerating Development of Practices and Technologies Fund (ADOPT) – providing collaborative farmer-led, innovation grants. Defra says ADOPT is aimed at farmers and farm businesses to enable the trial of new on-farm technologies and approaches.

Grants will be available through Innovate UK to fund practical research projects of £50,000-£100,000, which strive to prove innovative ways of boosting farm productivity, food security and nature's recovery across England.

Defra adds that to ensure farmers can access ADOPT and the evidence generated effectively, a bespoke Support Hub is available to support applications and encourage collaboration. The hub is led by RSK ADAS with support from the UK Agri Tech Centre and the Soil Association. Furthermore, the British On-Farm Innovation Network (BOFIN) is one of the programme's approved project facilitators.

The total funding pot stands at up to £20.6M for 2025/26. While issuing further guidance, Defra says to be eligible for a share, projects must focus on improving one or more of the following areas:

- Productivity and profitability

Reaping the benefits of D2D tech

With the government's Farming Equipment and Technology Fund (FETF) re-opening soon, how could direct-to-device technology benefit machine maintenance?

While the many benefits of new technologies are well understood, there's a catch – shiny new tools must be looked after, points out satellite expert, Eric Verheylewegen of Viasat Enterprise.

"This involves time and in some cases, growers will require new skills or more specialist tools to get things back up and running. Breakdowns are costly, repairs expensive, and downtime can have a significant knock-on impact on production," he continues.

Internet of Things (IoT) enabled monitoring powered by continuous satellite-enabled connectivity can help farmers to sustain the condition and operational ability of their machines via predictive maintenance, helping to detect issues early and so prevent costly repairs.

"But farms are by definition situated in remote areas, often with limited or unreliable cellular connectivity which can prevent farmers from unlocking these valuable insights," says Eric.

However, direct-to-device (D2D) is a new technology which aims to reduce the barrier to satellite connectivity while enabling farming equipment to seamlessly switch between a combination of cellular and satellite networks.

This could be a game-changer for farmers eager to stay hyper-aware of the condition of their machinery, suggests Eric. "Enabling near-constant oversight, D2D can help to improve the longevity of agri-tech investments, driving productivity rather than disrupting it."

He highlights that currently, the agricultural sector faces a variety of challenges with unreliable cellular connectivity remaining a key problem for farmers eager to adopt new technologies. In fact, a recent NFU survey indicated almost half of participants deem their current broadband to be insufficient for their business.

Maintaining new technology
A catch with new technology is that it must be looked after, points out satellite expert, Eric Verheylewegen.

"Despite these connectivity limitations, we've found the appetite for IoT adoption within the agricultural sector remains strong. In fact, data suggests

- Resilience to challenges such as climate change and market volatility
- Progress towards reducing emissions from farming

THE FARMING INNOVATION PROGRAMME (FIP)

In May, a further two competitions will open under the Farming Innovation Programme (FIP). Through FIP, funding is available to farmers or foresters who want to develop and use new, innovative methods and technologies.

The two competitions are as follows:

- £12.5M to support collaborative research into ways to reduce on-farm emissions, helping farms to become more sustainable and climate-resilient
- £12.5 to fund R&D using precision-bred crops to improve yield, reduce chemical inputs and enhance disease resistance – building on the new opportunities enabled by the Genetic Technology (Precision Breeding) Act 2023

It's believed further industry-led competitions will be revealed by Defra offering up to £17.6M funding across various projects.

THE FARMING EQUIPMENT AND TECHNOLOGY FUND (FETF)

FETF offers grants for equipment, technology and small infrastructure to boost productivity, improve slurry management and enhance animal health and welfare.

Defra says during the past three rounds of FETF, farmers, foresters and other contractors in England have received more than £107M to buy new equipment and technology.

Another round of FETF is being launched imminently, with grants of £1000- £25,000 available.

the industry has increased its IoT budgets by 16% since 2021, demonstrating a clear eagerness to invest in this technology.

"This is explained by return on investment. Farmers can reduce nearly a third of their repair costs by using predictive maintenance methods. But how can we tackle this connectivity conundrum?" questions Eric.

He believes D2D connectivity could help bridge the gap between cellular and satellite networks to provide continuous and reliable connectivity. "It could even act as a backfill when cellular connectivity is patchy or fails, for example, during extreme weather."

With this reliable connection, farmers could harness the full potential of predictive maintenance, receiving real-time alerts about their machinery from satellite-connected sensors. Eric says this allows for the early detection of issues such as decreased tyre pressure, poor engine function, or leaks or blockages in irrigation systems.

"As technology in farming continues to show every sign of acceleration, reliable satellite connectivity through D2D technology may be a key tool to help manage the other – giving farmers the ability to successfully maintain a growing arsenal.

"Whereas proactive maintenance can also help farmers to reap the full rewards of increased investment. By embracing this, they can keep machines operating efficiently, optimising output and avoiding unexpected costs for overall improved resilience of their agricultural operations," concludes Eric.

"The reason being, we have powerful long-range 4G antennas which can cover a radius of up 1-2km and are suitable for low-bandwidth applications or snap-shot type data transfers from the field. This is in contrast to 5G which offers higher bandwidth capabilities for large amounts of data or video material, suitable for use within buildings or for closer to the farm office," he adds.

Once data has been captured and fed into a server, it's then available for interpretation via a series of integrated iPad dashboards, enabling the estate to be managed remotely. This is also where device management takes place, with the capacity to remove registered sim cards should there be a security breach.

One use case currently being explored is monitoring pest activity within the farm's grain store, points out Andres Cruz Gordon of Virgin Media O2 Business. "By installing a pheromone-enhanced camera trap, it's possible to not only classify the species of insect being detected, but to also indicate when that pest pressure will be at its threshold and therefore intervention is required, suggesting the most optimal window to intervene.

"This is achieved by integrating the camera trap data with information from the farm's weather station, so utilising insights such as temperature and humidity. Farm data can often be fragmented, but by connecting data silos in this way, we can demonstrate its greater value," he says.

According to Stephen, the end goal is to create a digital twin of Overbury Estates with everything that's monitored being available through one dashboard.

Efficient management

By managing fertiliser tank and water trough levels remotely, it mitigates Jake Freestone having to drive to different locations across the estate which saves time, he says.

Grain store pest monitoring

One use case currently being explored in the project is monitoring pest activity within the farm's grain store.

"By making more of the data available and interpreting in a useful way, it's possible to achieve greater efficiencies and productivity across the business."

FERTILISER STOCK CONTROL

Another application being tested is using sensors to monitor liquid fertiliser levels, a concept to assist with stock control, says Overbury Estates' farm manager, Jake Freestone. "In an ideal world we'd like to have sensor equipment installed across all of our sites, for an accurate assessment of the fertiliser we have in stock.

"By managing this remotely, it mitigates me having to drive to our different locations which saves time. Also if we have a sudden, significant drop in level, we'll instantly know there's a problem meaning we can contain it and reduce any environmental impact."

Similar technology is also being used to monitor water trough levels for the estate's livestock and racehorses. As with the fertiliser tanks, the sensors send an alert if there's a drop in level as well as providing a constant loop of information including water temperature.

"Although we inspect our racehorses several times a day, for the more remote troughs used with some of our livestock this could really save time," explains Jake.

At a field-scale, the private network is supporting remote AI-enabled pest observations, similar to what's being deployed in the grain store. This has been achieved by using existing cabbage stem flea beetle camera traps plus new aphid and ladybird-trained camera traps.

"The cameras take pictures throughout the day, using AI to identify the number of and insect species," explains Virgin Media O2 Business' Sarah James. "That can then be correlated with information from the farm's weather forecasting app to identify trends; the aim is to limit the over-use of insecticides," she suggests.

Insect activity

As well as monitoring pest populations, AI-powered camera traps also monitor beneficial insect activity.

Jake says this is particularly useful for monitoring pest flights and therefore could help to mitigate aphid-vectored barley yellow dwarf virus, as well as the threat posed by orange wheat blossom midge. "With a small window of opportunity to control adult OWBM before they lay their eggs on the insides of wheat ears, this technology provides a chance to learn when the first midge have arrived in the crop, and to then consider the likelihood of a population increase."

He adds that the camera traps also monitor beneficial insect activity. "As a business we prioritise integrated pest management, so this provides critical insight to help us to minimise our insecticide use."

Andres highlights that the project is constantly evolving with sensors now being installed to remotely identify nitrates levels in a nearby watercourse, whereas long-term, the team hopes to address the ever-prevalent issue of farm safety.

"With a lot of lone working happening on the farm technology has the ability to provide alerts if someone has fallen or hasn't moved for a considerable amount of time. Equally, this could be part of the farm's security system as an intruder alarm," he says.

And this is made possible because the equipment used during the trial is carrier-grade and should have a 10-15 year life span at least, comments Stephen. "Rather than home-use or basic IT-grade, it's the same quality as network service providers use for their infrastructure," he concludes.

Hand-held soil testing

New device offering in-field testing in minutes could become a valuable tool for benchmarking soil health

Imagine being able to conduct an in-field soil health test and receive the results within minutes using just a teaspoon-sized sample? Well rather than being a fanciful pipe dream, that could very much become a reality following the launch of an innovative piece of kit.

The UK-orientated device, brought to the market by PES Technologies last year, is hand-held and smart phone-controlled, and offers near real-time in-field soil health analysis.

Co-founder, Dr Jim Bailey, says the innovation came about as a result of the growing demand for quality yet affordable soil health testing. "This led to working with NIAB-EMR on an Innovate UK-funded project to develop a proof of concept. Following this, we collaborated on a larger project with NIAB-EMR, Hutchinsons, University of Essex, the Natural Resources Institute at the University of Greenwich and Small Robot Company."

The device acts as an 'electronic dog's nose' – creating an aroma fingerprint from the gas released by the microbes in soil. To achieve this, users load a cassette-type consumable containing a teaspoon of soil, its volatile organic compounds (VOCs) are then assessed to provide more than 12 key quality indicators.

To address the different chemical, biological and physical properties of soil, these include: microbial biomass, basal respiration rate, soil organic matter, water holding capacity, pH, extractable nitrate and ammonium, a texture classification, and key nutrient levels.

"As humans, there's so much we miss when using our senses, whereas a dog for example, learns so much more through scent."

Jim says unlike traditional testing methods where a soil sample is sent by post for evaluation and the results returned days or weeks later, the PES system takes only five minutes. "Results are delivered to the user's smart phone while they're still in the field ,with a GPS location, time and date locked in.

"As humans, there's so much we miss when using our senses, whereas a dog for example, learns so much more through scent. This is what we're aiming to emulate through our innovation."

The device is currently available for arable mineral soils, although work is taking place to train its AI-powered sensor to assess samples from peat and permanent pasture too. Further metrics are also in the making, adds Jim.

In terms of accuracy, PES Technologies claims the system offers at least 80% accuracy for each soil characteristic it provides, which it says is the industry benchmark for in-field soil testing devices.

The device is commercially available now and the company welcomes requests for a product demonstration, says Jim. "Our target market is anyone who conducts large volumes of soil sampling – so agronomists, advisors and larger farming businesses. The cassettes are sold as a bundle equating to £25/test with a one-off purchase cost for the device unit, but the associated software is free for the duration it's being used."

Jim believes the device can play a role in helping farmers and agronomists to quantify soil health and measure the impact of any interventions being made. "That way they can optimise the way they're managing their agricultural systems, monitor progression over time and enhance their overall knowledge.

"We perceive our device as a means of empowering individuals to learn more about their soils and the trends this level of data can unlock," they conclude.

Speedy service
Unlike traditional testing methods where a soil sample is sent by post for evaluation and the results are returned days later, the PES system takes only five minutes.

Soil scents
PES Technologies' Dr Jim Bailey says the company's soil testing device is aiming to emulate the high scent capacity of a dog's nose.

Nature NATTERS

WITH MARTIN LINES

Crops: whatever the weather

May has to be one of the best months of the year and is when nature is good to us. The countryside is green and lush with trees and hedges in blossom, and the burst of spring life all around. There's joy in seeing that first swallow, the first pair of English partridge, and watching the primroses gradually succeeded by bluebells and cuckoo flowers in the verges and woodland around the farm.

It's so important to take time out to enjoy the countryside that we're lucky enough to manage. Many are working in offices and cities and don't get to experience the mental and physical benefits of nature.

Sometimes I have long days in front of the computer screen or in London, and I long for the opportunity to take a break and walk around the farm. Not only do I enjoy seeing the crops come to life, I also appreciate the wildlife, knowing I've helped to encourage this biodiversity back onto the land, and in return, it benefits my farm business.

Fortunately, the April rain came just in time to breathe life and energy back into our emerging crops after a long dry spell that nearly outstayed its welcome. Looking around the countryside, many farmers have made good use of this time to establish their crops. Autumn-sown crops have also started to come back to life and show promise of potential yield.

With crops established and fertiliser and nutrient plans completed, the focus turns to disease and weed control. Of course each season brings us a different problem. On our farm, just as we get on top of one weed burden, another seems to appear, with creeping thistle being the latest arrival and our current focus. I'm also reading concerning reports of new, 'disease-resistant' crop varieties already becoming more susceptible.

With our ever-changing weather patterns and climate forecast for the coming years, using varieties that can provide good returns despite unpredictable weather is becoming increasingly important. Many organisations solely prioritise the investigation of drought tolerance in crops, when we've been experiencing the wettest, cloudiest summers for years.

We'll increasingly need crop varieties that provide good all-around performance in a variety of extreme weather conditions, as we don't know precisely what climate change will bring.

Furthermore, we'll require resilient, healthy soils to support our crops effectively. The biodiversity on my farm includes fungi, protozoa, and bacteria in the soil microbiome, all of which support the resilience and vigour of my crops in the face of extreme weather. I can't control the weather, but I can control whether my land is a welcoming haven for nature.

It's very fulfilling to see nature spring into life.

I recently spent the afternoon at AHDB's headquarters to hear about their work; they're trying to increase farmer involvement in their projects going forward. As someone who's involved in many things and tries to stay up-to-date with developments in the farming industry, I was unaware of the great work they're doing and the resources they produce.

They offer guidance on the benefits of regenerative farming, approaching integrated pest management, and current farmer-led field trials, to name just a few examples. It's all hosted online, for free, and breaks down complex ideas into easily digestible and practical information.

Keeping up to date with the latest AHDB disease reports can provide guidance on what we should be looking out for in our crops, particularly as new diseases are identified and as resilience and tolerances change.

Are you up to date on the latest market and crop reports? I highly recommend visiting the AHDB website and signing up for their regular emails as a simple way to stay informed in this changing climate.

We must produce our crops whatever the weather, so the more we equip ourselves with the knowledge and skills to work with nature, the more we'll succeed in creating resilient farm businesses. ●

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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In with the new

"No event is a silver bullet, but I'd say Cereals offers a lot to a range of arable and diversified businesses."

ANDREW WARD

Cereals 2025 may be returning to pastures old, but its line-up of seminars, speakers, displays and demonstrations promises to provide visitors with a swathe of new content, knowledge and information. *CPM* details what the show has in store.

By Melanie Jenkins

Visitors to this year's Cereals Event can expect to see the latest developments in arable agronomy, machinery, technology, and business advice; from over 400 exhibitors, more than 200 live demonstrations, two days of seminar programmes, and several hundred individual crop plots on display.

For the first time in 17 years the event is returning to Lincolnshire-based Heath Farm on 11-12 June. Host farmer, Andrew Ward MBE, observes that farming has experienced some of the biggest changes since WWII. "There's tremendous pressure on producing food and being able to do it profitably. And while some of this can only be resolved through government and policy, which farmers have been campaigning for, there are also opportunities at farm level. "

CONVERSATIONS

"No event is a silver bullet, but I'd say Cereals offers a lot to a range of arable and diversified businesses and their ambitions. Visitors can find the knowledge, technology and, importantly, the conversations that can help safeguard their future."

New to the show this year is the BASE-UK Regen Conference area themed 'Robust farming in a changing climate' – which aims to feed farmers' growing appetite for more knowledge, demonstrations, and experience.

A series of seminars and open-floor Q&A sessions will be shaped by the expertise and experiences of some of the leading regen farming and advisory voices – exploring how

Returning home

For the first time in 17 years Cereals is returning to Andrew Ward MBE's Lincolnshire-based Heath Farm on 11-12 June.

regen ag can fit and impact farm businesses of today and tomorrow.

The KWS Seed to Shelf Stage returns with the agenda set to provide two days of dynamic panels and Q&A sessions. With subjects ranging from post-budget agriculture and harnessing new technologies to diversification, financial strategies, and much more, it should hit on the key topics that are shaping the future of farming.

Whereas focusing on resilience and the future of the arable sector, the new Young Farmers Programme will welcome the next generation to a multi-session day. Fresh talent will also be found in the agronomy zone where budding agronomists will be put through their paces in the new Ceres Rural Crop Challenge.

Those looking to take control of their numbers through digital tools that manage risk, help to drive efficiency and optimise production, can visit Yagro's stand where the team will be ready to share their knowledge and expertise.

Then over at Cereals' agronomy zone, more than 600 individual crop plots from 25 leading exhibitors will display a diverse range of crops, agronomy simulations, agri-environment options, and demonstrations of crop-focused innovation. For example, RAGT will be showcasing its new soft feed wheat, RGT Hexton, which has achieved yields of 108% in a second wheat position.

Visitors can also expect to see popular Groups 1 to 4 winter wheats and two- and six-row hybrid barleys as part of the Ceres Rural winter wheat and barley feature.

Education station

The KWS Seed to Shelf Stage will cover subjects ranging from post-budget agriculture and harnessing new technologies, to diversification and financial strategies.

ALTERNATIVE CROPS

Those looking to explore more niche options are invited to visit Premium Crops' stand which will be displaying crops such as canary seed and will be poised to inform visitors on research into areas such as chickpeas.

Of course the 20m-long Niab Soil Hole will also return, giving a unique insight into cultivation effects and crop growth below ground. Also focusing on matters underground will be the NAAC Drainage Hub as part of Cereals' working demonstration offering, combining technical expertise with a practical approach to land management.

Back above ground, the Drill Demos will showcase the latest in cultivation and drilling machinery and technologies. Visitors will also be able to check out more working demonstrations by the likes of Agriweld, Merlo, and TWB Engineering and AgXeed and Autonomous Agri Solutions, with drone technology also in action.

For those looking to peruse machinery at the show, Claydon's NutriSeeder, part of the Opti-Till range, will be on

Standing out

John Deere will be bringing the world's largest production tractor to the show: the 9RX 830.

display. The 7.5m Straw Harrow has two versions: A single 200-litre hopper with one metering unit or a twin-hopper set-up with dual systems for applying and mixing two seed types simultaneously.

Horsch will be unveiling the new generation of its Partner FT front tank range. The expanded line-up now includes double-tank options comprising 1600, 1700, and 2100 litres, and a triple-tank model offering 2500 litres, joining the existing single-tank system.

BIG KIT

Perhaps a stand-out for visitors will be found at the John Deere stand, where the firm is bringing the world's largest production tractor to the show. A first look at the eye-catching 9RX 830 will give farmers the opportunity to see how the new 913hp tracked machine has been designed with power, comfort and productivity in mind.

John Deere will also be showcasing three of its sprayers – the 340M self-propelled, and the R740i and R962i trailed models and will be doing demonstrations in the Syngenta Sprays & Sprayers arena.

Unique perspective

The 20m-long Niab Soil Hole will also return, giving a unique insight into cultivation effects and crop growth below ground.

Then over at Amazone, attendees can see the company's self-propelled Pantera 7004 and 4504, the trailed UX Super, the UF 02 mounted sprayers, and the FT 1502 front tank. Whereas Fendt's Rogator 600 returns to the arena, joined by the new Rogator 645 Gen 2, a compact yet powerful solution tailored for small to medium-sized farms.

Other manufacturers such as Bateman Sprayers, Chafer Machinery, Household Group, Knight Farm Machinery and Kuhn will also be demonstrating their machines.

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Farming's hidden crisis

Planning the succession of a farm business is something all farmers have to do, yet there's often a hesitancy or difficulty in doing so. *CPM* speaks to the experts to find out the who, what and why of what should be considered.

By Charlotte Cunningham

Succession in UK farming has long been one of the most pressing, yet least spoken about, issues in the industry. Despite the perhaps rather romantic idea of passing on a farm from one generation to the next, the reality is far more complex – tangled in emotion, legislation, and evolving business models – and made only more challenging by recent changes to the legal framework.

As family farms confront unprecedented economic pressures, technological disruption, and changing environmental regulations, the critical question emerges: how can agricultural businesses successfully transition between generations? And with more than a third of UK farmers now aged 65 or older, the clock is ticking...

Succession isn't just about who inherits the land. It's about leadership transition, business strategy, long-term viability, and often, navigating family dynamics, all of which were explored in detail during a recent webinar hosted by The Royal Agricultural Society of England (RASE).

PERSONAL ACCOUNT

As a sixth-generation farmer's daughter, Professor Lee-Ann Sutherland from the James Hutton Institute gave both a personal and scientific perspective on agricultural succession and the importance of handing over the reins to the younger generation. "Younger farmers are the critical drivers of agricultural innovation. Statistically, they're more likely to diversify, adopt new technologies, and bring transformative approaches to farming practices.

"There's also good evidence that farms with identified successors will invest for ▶

Drivers of innovation
Younger farmers are the critical drivers of agricultural innovation, explains Professor Lee-Ann Sutherland of the James Hutton Institute.

The story untold: what happens when an agronomist retires?

While focus is often on the farmer themselves when it comes to succession, there's another important person to consider when planning the future of the farm... the agronomist

Agronomists are often lovingly coined as an additional member of the family due to the close-knit relationship they have with farmers, often spanning over many years – and even generations – so what happens when they decide to retire?

In an industry where relationships and deep agricultural knowledge are paramount, succession planning has emerged as a critical strategy for agronomists and Hutchinsons' approach to developing and transitioning agronomic talent highlights the importance of maintaining continuity and expertise in crop management.

This is something Sam Hugill, Hutchinsons' area business manager for Yorkshire, has been involved in himself, providing him with a unique insight into how modern agricultural businesses are preparing for generational shifts. With nearly a decade of experience, Sam represents a new breed of agronomist – professionally trained, strategically developed, and committed to long-term client relationships.

The journey to transition begins with comprehensive training of the next generation, explains Sam. "Hutchinsons' foundation scheme spans three years, providing new agronomists with a robust educational framework. But learning doesn't stop there – agronomists are encouraged to pursue additional certifications, diplomas, and specialised courses that continually enhance their skill sets.

"The in-house training Hutchinsons offers is very good," he continues. "But we do a lot of external training as well. The industry has changed significantly during the past 10 years so we're always evaluating how we can improve our approach."

With budding new agronomists waiting in the wings, the transition between outgoing individuals and those incoming is carefully managed. Unlike abrupt handovers in other business settings, Hutchinsons typically implements a 2-3-year crossover period. This allows incoming professionals to gradually build relationships with farmers, understand specific land characteristics, and learn intricate farm management nuances, explains Sam.

"Some transitions can be completed in six months, while others might take five years," he adds. "It often depends on the farmer's comfort level and the complexity of the agricultural operation. When I was a new agronomist, I spent two years shadowing someone who was my senior – and retiring – and it really helped me to build up a comprehensive knowledge of the farms I was taking on."

The human element is paramount. As alluded to, farmers often develop deep, almost familial connections with their long-standing agronomists. In recognition of this, Sam says Hutchinsons takes a sensitive, strategic approach to retirement planning – ensuring to involve both parties. "Annual meetings with senior agronomists help to identify potential retirement timelines, typically starting conversations when they're in their late 50s or early 60s.

"We ask our agronomists to give us as much notice as possible and most are very co-operative. Sometimes someone might plan to retire at 65 but decide to stay an extra year or two, which actually helps us to further train the next generation."

Farmer relationships are carefully navigated during these transitions too. The ideal scenario involves gradually introducing new agronomists, allowing farmers to become comfortable over 12-18 months before any formal handover. When challenges arise – and they inevitably do – flexibility is crucial, he stresses.

"Not every personality fits perfectly. If a relationship isn't working, we're prepared to find alternative solutions, always prioritising geographical convenience and maintaining strong client connections."

Passing the baton
With a vast amount of farm knowledge attained by agronomists over their working life, the transition process between outgoing and incoming professionals is carefully managed to ensure it's as smooth as possible for both the agronomist and the farmer, explains Hutchinsons' Sam Hugill.

A key principle in making the transition as smooth as possible is distributing workload, he notes. "Rather than overwhelming a single new agronomist with an entire portfolio, responsibilities are typically split between two or three regional individuals. This approach mitigates risk and provides a support network for emerging talent."

Beyond traditional agronomic advice, companies such as Hutchinsons now offer comprehensive services including digital platforms like Omnia and environmental management schemes too. This broader approach helps to maintain client relationships during personnel transitions, believes Sam.

Looking ahead and considering the next generation of agronomists, Sam says his own career trajectory illustrates the potential for professional growth. Starting as a foundation trainee, he now manages a team of 10 agronomists, something he says is a testament to the company's commitment to internal development.

The ultimate goal transcends short-term fixes, he concludes. "We're here for the long run. If a farmer has been with us for 20 years we want to continue that relationship for another 20 years. Retention and continuous growth with farming families is what matters most."

10 years prior to succession. Successors will gradually be integrated into decision-making and are often keen to make their mark – to try something new. Essentially, succession is an important trigger for transformational change on farms."

However, this potential is often stifled by structural and emotional barriers which can prevent smooth generational transitions. "Succession is messy," explains Lee-Ann, drawing from both her academic research and personal family experience. "The path from one generation to the next is rarely straightforward, involving complex negotiations of family dynamics, financial considerations, and individual aspirations."

So where exactly do farmers begin on this journey?

The legal complexities of farm succession is one of the most critical parts of the plan to get right, with potential catastrophes awaiting families who fail to properly document their business arrangements, explains Esther Woolford, litigation solicitor and partner at Clarke Willmott. "The fundamental challenge lies in the unique nature of farming businesses, where professional and personal lives are inextricably intertwined," she adds.

To put this into context, Esther says there are a number of common scenarios which can be used to illustrate the impact and importance of having a proper plan in place. "So starting with if there's no clear succession plan in place – and particularly common, no written partnership in place – then significant steps can happen for the business, such as joining a family member as a partner, or moving the farm onto the balance sheet of the farm accounts for good tax reasons. But without any clear terms agreed as to how to resolve differences, then you fall back on the Partnership Act 1890."

Open, honest discussions

Heather Wildman, professional facilitator at Saviour Associates, says it's important to be honest during succession discussions, although this can be difficult as people are often afraid of upsetting and offending others.

Although it's a workman-like act, it's archaic and as such, it doesn't cover all modern scenarios which might arise between partners, warns Esther. "One key issue is making decisions and under the Act, if you're going to make a fundamental change, then you require unanimity. And so of course, if you can't get to that unanimity, you can get stalemate."

DISSOLUTION RISK

"In addition to this, once you've joined a partner to the business, if there's no agreement about their exit then a common occurrence is that one partner will seek to dissolve the business. This means applying for a dissolution which results in the sale of all assets on the open market."

Esther adds that this is important information to keep in mind. "What we commonly see is that people expect to just be able to buy out the share of the partner wanting to exit the business. However, absent agreement and having no partnership agreement in place, other partners have no right to buy out the exiting partner.

"We know that the default position under the Partnership Act is that the court will most likely seek to sell those farm assets on the open market, because this is seen as the only truly fair way of establishing value."

Esther says that landmark legal cases have also demonstrated how promises made around the kitchen table can escalate into complex legal battles, with children who've worked on family farms for decades potentially claiming significant financial compensation through legal doctrines like proprietary estoppel.

"This is a doctrine of equitable law which means if a promise or representation has been made – commonly to one of the farming children – that they'll be able to take over the farm one day and they've relied on that to their detriment, then the court might order that an equity has arisen such that they're entitled to the farm and should be given that entire interest, if it'd be unconscionable for the promise to be unfulfilled, or to resile on their promise."

Potential catastrophes await

The legal complexities of farm succession is one of the most critical parts of the plan to get right, with potential catastrophes awaiting families who fail to properly document their business arrangements, explains Esther Woolford, litigation solicitor and partner at Clarke Willmott.

One particularly striking case is Davies v Davies which involved a daughter who worked on her parents' farm for 25 years ultimately being awarded £500,000 after proving she'd been promised a share of the farm. "This case is often referred to as the Cinderella cowgirl," says Esther. "The courts agreed she did have an estoppel and was awarded in the end a sum of £500,000.

"While I'm arguably doing myself out of job in saying this, what cases like this show is that litigation has significant costs and should be avoided. Clear communication and formal documentation will enable this and are critically important for all parties involved when succession planning."

Although communication in theory is simple, it's something many farmers struggle with, explains Heather Wildman, professional facilitator at Saviour Associates. "A lot of people avoid talking about succession because they're terrified of the 'six Ds' – death, disability, disease, disaster, divorce and disagreements," explains Heather. "But one way or another, the farm business will have to transition eventually because the only certainty we all have in life is that we'll die at some point.

"Thankfully, we don't know when, we don't know how, and we don't know in what order, and that's why I really push to get more families talking about and de-risking their business."

Heather says her approach goes

Tax-savvy strategies

Samantha Doherty, tax specialist and partner at Thrings Solicitors, says while there are significant tax challenges to navigate during succession planning, there are strategies to mitigate against this, including carefully structured wills and strategic lifetime gifts.

beyond traditional financial planning, instead focusing on holistic family communication. "I encourage people to discuss what their individual visions and dreams are, as well as where the farm business is now and what they envisage it being in the future.

"It's really important to be honest about what you want and this can be difficult as people are often afraid of upsetting and offending others. But it's vital that the incoming generation is enthusiastic and excited about the future of their farm business so the sooner you start these discussions, the better."

For the exiting generation, something Heather also champions is creating comprehensive 'how-to' manuals that document not just financial assets, but family history, deeds, bank account information and even passwords for different accounts. "The goal of communication – in which ever format you do it – is to create a shared vision that respects both the legacy of previous generations and the innovative potential of younger farmers."

While communicating the aspirations of the individual parties is vital, something which is likely to impact on these being practically feasible is tax considerations – with recent budget changes adding another layer of complexity to succession planning and significantly impacting inheritance tax relief, creating potential financial challenges for farming families.

Samantha Doherty, tax specialist and partner at Thrings Solicitors, says while there are significant challenges to navigate, there are strategies to mitigate against this, including carefully structured wills and strategic lifetime gifts.

"The biggest thing that's come out of the budget is that the threat of paying more tax has brought planning to the forefront of farmers' minds, whereas pre-budget, a farm could be passed on without any tax consequences," says Samantha. "As such it was quite easy to ignore the succession planning that's required, as it was largely assumed by many that the business was going to be passed on somehow and there wouldn't be any tax consequence from it.

"Now we have exactly the same problems with succession as we had previously, but just the added problem of that if it's not dealt with in the current generation's lifetime, there's potentially a massive inheritance tax bill at the end of it."

WILL STRUCTURES

To avoid this, Samantha recommends firstly looking at the structure of any existing wills. "Let's take a fictional scenario of Mr and Mrs Farmer. Mr Farmer owns the entire farm and enterprise which operates in his name as a sole trader. He's married to Mrs Farmer and they have two children – one who works on the farm and the other who works away. The value of the farm is approximately £10M.

> *"Your farm's future depends on the conversations you're willing to have today."*

"The couple have simple wills and have left everything to each other. Based on the scenario above, if they make a simple change and leave their £1M APR and BPR allowance to the next generation – or to a trust depending on whether they know who the next generation is going to be at that point – then they can have £2M inheritance tax free, which will be a saving on inheritance tax of £200,000. So it's quite a simple thing to change but gives a significantly different outcome for the next generation."

Another aspect to consider is gifts during lifetime, explains Samantha. "This all falls nicely with succession planning, by considering who the next generation is that's going to be farming and how they can be incentivised to carry on and take over the business.

"By making gifts of agricultural land, you can apply for capital gains tax holder relief, so there isn't an immediate tax on making the gift and provided you survive seven years from making the gift. It's outside of your estate from an inheritance tax point of view," she says. "However, something that you really have to be aware and careful of, is making the gift but reserving some form of benefits. You have to be sure that you don't require the assets that you are gifting."

Samantha highlights that with partnerships, it's simpler. "For example, if the children are involved in the partnership and they get 5% profit, if you give them some of the capital, their profit share goes up with the gift and yours reduces. In this case, you haven't reserved the benefit, but you have to be careful to ensure the gift is a full gift."

Something else that's likely to come into play a lot more with tax changes is the use of trusts, believes Samantha. "If you aren't sure as to who you want to gift the asset to, or there are issues within the next generation, then gifting the assets into trust might be a good option.

"If you gift before April 2026 there are no tax consequences of gifting assets into trust, but in the same way as a traditional gift, you have to survive for seven years for it to be outside of your estate.

"The negative to gifting into trust is that it's subject to 10 yearly charges, which would be 3% of the value over and above £1M. But that might be a figure that the farm could sustain, because once again, you can pay that over 10 years interest-free"

Beyond the technical considerations, Lee-Ann concludes by flagging the deeply human nature of farm succession. "Talking about succession difficult, but it is the best thing you can do for your family in the long term. It's about more than transferring assets – it's about preserving family relationships, agricultural heritage, and creating a sustainable future. Each farm tells a unique story, and successful succession requires actively working together to make sure that story carries on into the next chapter, and the chapter after that.

"The message is unequivocal: the time to start planning is now. Your farm's future depends on the conversations you're willing to have today." ●

One size which could fit all

With the release of its 600 Vario series in late 2023, Fendt inferred that a four-pot engine was the way forward for those wanting a 200hp tractor. *CPM* visited a recent field day to find out why.

By Martin Rickatson

When it comes to tractors, the 150-200hp power bracket is one of Europe's greatest by volume, accounting for models used across a range of farm sizes and enterprises. Often being the largest tractors on mid-sized arable units, they're equally likely to be found taking the jack-of-all-trades role on bigger farms too.

Increasingly though, while this output sector used to be solely six-pot territory, engine designers have recently found ways to extract more power from four cylinder powerplants – designing compact, manoeuvrable, lighter tractors which benefit from CVT transmissions, further aiding frugalness with fuel.

One of the sector's latest entrants is AGCO's Fendt brand with the 600 Vario series launched at Agritechnica 2023. This power bracket is one long dominated on arable farms by the brand's 724 Vario – a 240hp six-cylinder tractor that's now in the middle of a refreshed 'Gen7' line launched in 2022, with 203-303hp maximum outputs from six-cylinder engines. Below this, Fendt's four-cylinder offering had topped out with the 500 Vario series, headed by a 163hp (max) model.

The gap between the two ranges was filled just over 18 months ago by the release of the 600 Vario series, featuring a new AGCO Power Core50 engine used exclusively by the German brand. It uses similar design principles to the first of the new Core engine series, the Core75 introduced alongside the 700 Gen7 series tractors, but is a five-litre, four-cylinder design.

EXPERIENCED TEAM

The AGCO Power engine business and its team of Finnish engineers isn't new to extracting more power from four cylinders – using the same power provider, Fendt's Valtra stablemate has long offered high-hp four-pot N series models, currently headed by the 201hp N175.

But now, Fendt has gone a stage further with the four-model 600 Vario series and its four-pot peak power figures of 164-224hp, offering a DynamicPerformance 15hp peak power boost. Maximum power is delivered at 1600rpm, while maximum torque of 950Nm is attained from 1200-

1600rpm, a low speed/high torque engine design combination integral to Fendt's iD low engine speed concept.

Established on larger Fendt tractors, this system boosts power availability at lower rpm, a principle said to enhance tractor performance through the typical working engine speed range for key tasks, while helping to reduce fuel consumption as a result. Rated engine speed is 1900rpm, with the main working speed range covered by the 1350-1800rpm engine speed sector, which Fendt says has a noticeable effect on noise reduction. The 620 Vario top model can reach its 50km/h top speed at 1250rpm.

The engine features selective catalytic reduction, a diesel particulate filter and diesel oxidation catalyst, and adds DEF/AdBlue to the exhaust stream to meet Stage V emissions regulations, but doesn't use exhaust gas recirculation meaning a lower operating temperature.

DEF consumption is claimed to be 6.5% of total diesel usage – but Fendt suggests this is more than offset by the reduction in overall fuel consumption. The first engine oil service occurs at 500hr, with no 50hr first service change, and servicing is further added by maintenance-free hydraulic tappets.

"A four-cylinder engine and a tractor designed specifically around it gives us a number of advantages at this output," suggests Phil Mattey, Fendt tractor specialist at AGCO. "We retain the high performance of a six-cylinder engine at this power level but benefit from a shorter design that's more manoeuvrable, a high payload, and low power-to-weight ratio."

Created specifically for the 600 Vario tractors, the TA150 continuously-variable transmission nevertheless inherits many features and characteristics of the TA Vario units recently designed and launched for other Fendt tractor ranges. They include a single range design with uninterrupted stepless travel right through to 50km/h.

Without compromise

Fendt's Phil Mattey says the 600 series retains six-cyl performance but brings manoeuvrability, payload and power-to-weight benefits.

Tougher tasks

The 600 series can be ballasted from a base weight of 7.7t up to the maximum gross weight of 13.5t.

VARIODRIVE

It's teamed with VarioDrive, a completely new iteration of Fendt's continuously variable transmission technology. At its heart is a single-range drivetrain meaning no interruption to drive when reaching the road and seeking maximum travel speed, with independent front and rear axle control.

The transmission continuously measures wheelslip on all four wheels and regulates the power input to each wheel accordingly. This transmission design, claims Fendt, maximises tractive force while protecting the soil from slip, minimising tyre wear and enhancing manoeuvrability.

The front axle drive system goes a step further than traditional 4wd. During turning, a central hydraulic pump supplying twin motors front and rear helps the front axle to be driven faster than the rear, pulling the front of the tractor around more quickly into the turn and reducing its turning circle – with its 2.7m wheelbase, a 620 with 540/65 R30 tyres has a figure of 10.1m, significantly smaller than for a 700 series tractor.

This also helps to reduce headland scuffing even when turning at full lock on cultivated stubble, believes Fendt, which suggests it may find particular appeal for users working with root crop/vegetable beds. Rear tyres up to a maximum diameter of 1.95m can be fitted to 600 series tractors, with the Fendt 620 Vario featuring 650/65 R42 units as standard.

Power-to-weight ratio is 34.4kg/hp and depending on the work application, the range can be flexibly ballasted via the front linkage and rear wheels. A gross vehicle weight is up to 13.5t, so despite the lighter overall bulk of the four-cylinder design, the 600 series is capable of safely hauling and stopping heavy trailed loads with ease when at speed on the road, says Fendt.

"The four-cylinder design offers much more, though," claims Phil. "Permitted payload on the 600 Vario series is 5.8t, so it's well-suited to handling heavy front and rear implement loads. Another major advantage is the ratio of payload to operating weight, where that 5.8t figure and 7.7t operating weight combination means the 600 Vario range achieves a 75% index, which is especially high in the compact standard tractor class.

"But the principle is, that the tractor can be ballasted to take on tougher tasks if required – with the addition of front linkage and rear axle weights it's possible to take that base weight of 7.7t up to the maximum gross weight of 13.5t. The power is there; the weight can be added and the manoeuvrability of the four-cylinder design remains,

JOHN DEERE

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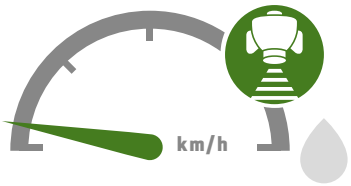

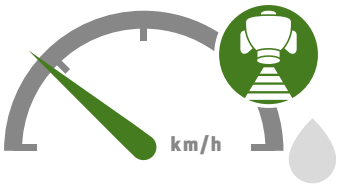

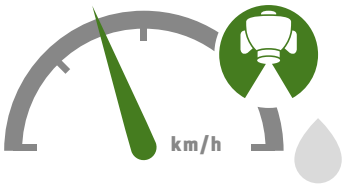

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along with those steering advances."

Safety-wise, there's a hydraulic dual-circuit braking system, Fendt's Reaction Steering with integrated return torque, and a brake light and deceleration assistant. A new trailer brake assistant enhances safety when the tractor/trailer combination is travelling downhill at speeds of up to 25 km/h, with a sensor measuring the thrust torque of the trailer via the transmission. If this detects that the trailer is pushing the tractor above a pre-set safety limit, it automatically activates the trailer's air braking system.

Of course, while drawbar pull is one factor with a tractor of this size, hydraulic power – in terms of both rear linkage lift capacity and remote valve flow and pressure – is equally as important. With the 600 Vario series, there are hydraulic pump options of 152 l/min or 205 l/min, both operating at 200 bar, and the 600 models inherit the 700 Gen7 series' flat-face hydraulic connections front and rear, with up to five rear remotes plus power beyond and up to two front remotes, plus three mid-mount valves for those equipping their tractor with a loader.

The design allows the use of standard or flat-face hydraulic couplings whereas the new draft control for the 9790kg capacity rear linkage shifts the weight of the implement proportionally to the rear axle of the tractor, to boost its tractive capability.

Loader users can choose to use a dedicated three-way proportional valve connection to allow functions without losing services front or rear. Designed especially for the 600 Vario series, the new 3.4t lift CargoProfi 5.90 loader features a new hydraulic and electrical multi-coupler with hydraulic attachment locking, weighing and return-to-dig functions.

Claiming it's committed to keeping tractors up to date for customers, Fendt says continuous updates of the tractors' operating system are possible via the FendtOne operating system. It features an open system architecture that, it explains, is being continuously grown and developed

Improved manoeuvrability

A full-lock turn starting from the same spot shows the difference in manoeuvrability between the Fendt 620 (left) and the 724.

Fendt field day 620 (four-cyl) vs 724 (six-cyl) task comparison

Test 1: Cultivation with Vaderstad Carrier 525

	724 Gen6	620	Difference
Diesel used (l)	15.1	12.5	-2.6
Diesel l/ha	7.4	6.1	-1.3
Diesel l/hr	37.7	31.2	-6.5
AdBlue l/hr	0.3	0.4	+0.1
Time (min)	24	24	0

Tractors operated with same set linkage heights and cultivator with same press roller height. Both tractors equipped with a front 1250kg weight but no wheel weights.

Test 2: Transport with KTwo 16t trailer half-loaded with maize silage

	724 Gen6		620		Diff
	Route 1	Route 2	Route 1	Route 2	
Diesel used (l)	11.3	10.3	10.1	9.3	-1.1
Diesel l/100km	67.7	66.0	60.8	59.6	-6.6
Diesel l/hr	21.7	19.6	20.0	18.9	-6.5
AdBlue l/100km	2.2	2.2	4.3	4.1	+2.0
Time (min)	31	31	30	29	

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with partners and software. In this way, efficiency is maintained, the machine remains up-to-date and residual value is heightened, suggests Fendt.

FENDTONE BENEFITS

The FendtOne onboard and offboard systems are designed to combine smart farming and farm management solutions for field and office use. In FendtOne onboard, the multifunction joystick, a 10" digital dashboard and a 12" terminal on the armrest are standard. The optional 3L joystick in FendtOne onboard and another 12" terminal in the headliner can be specified for additional applications.

Smart functions such as the Fendt Guide guidance system, automatic Fendt Section Control or the use of Fendt Variable Rate Control are displayed as required on the individually assignable tiles on the terminals. For the first time, operators can now control implements by section on short work directly via the tractor terminal screen.

Arguably, the most interesting developments for FendtOne are its variable rate, tramline, TIM and slope compensation technologies. The new Fendt Implement Slope Compensation option allows drivers to specify an override of the target slope by setting a correction value per degree of slope. Working with an additional signal receiver on the implement, the tractor then automatically corrects its course depending on the current slope, keeping the implement on-track.

A Tramline Control update for ISOBUS-capable machines in the Fendt Section Control function

Customised options
The 3L joystick in FendtOne onboard and another 12" terminal in the headliner can be specified for additional applications.

package now enables the exchange of certain information between the tractor and attached drill. To optimally create tramlines, they're automatically calculated using the tractor's position data. Based on the previously defined rhythm, the sowing units are switched automatically to create the tramlines.

The linking of FendtOne's section control and variable rate control capabilities now makes it possible to reduce application rates to zero on an ad hoc basis, and work with spot spraying application maps. This enables fast switching of the nozzle bodies, points out Fendt, while it can also be used to create no-application zones.

TRACTOR IMPLEMENT MANAGEMENT

Lastly, the Fendt Tractor Implement Management (TIM) function is optionally available for all Fendt 600 Vario Profi+ machines with ISOBUS functionality. TIM allows compatible powered implements to control certain tractor functions to ensure optimum implement performance. The TIM Hitch and TIM PTO function extensions now enable the attachment to control the linkage as well as the PTO shaft, with example applications including automatic adjustment of working depth using application maps so that deep cultivation is performed only where necessary to reduce soil and steel use and protect soil structure.

Established for some time now on larger tractors in its range, Fendt has extended the availability of its VarioGrip variable tyre pressure system down to the latest 600 Vario models. Claimed to reduce wheelslip and ground pressure-induced soil damage – thereby protect against ground compaction and subsequent crop yield impacts – the fully integrated Fendt VarioGrip central tyre inflation system works with compatible VF tyres, which have a 40% variable tyre pressure band throughout which they can work.

The system reduces pressures in the field to an operator-selected, tyre manufacturer-approved level in a matter of seconds, increasing the contact patch of the tyres, boosting tractive power by up to 8% through more cleats on the ground, and can reduce fuel consumption by the same figure thereby increasing tractor/implement combination productivity, suggests Fendt.

Reinflating the tyres before leaving the field and heading out onto the road means reduced rolling resistance, leading to a further 2.0% fuel saving, adds Fendt, pointing to analysis carried out by Germany's South Westphalia University of Applied Sciences.

Using the FendtOne terminal in the tractor, the driver simply taps in the required pressure settings and the dual-line tyre pressure control system does the rest. Fendt VarioGrip can be ordered directly from the factory for both flanged and stub axles, for row-crop with dual tyres and also with wheel weights, says Fendt, pointing out that its broadened export markets mean a wider range of design and feature options have been created for its tractors. ●

Tyre inflation system

Fendt's VarioGrip central tyre inflation system is an option to allow tractors with VF tyres to be operated at different road/field pressures.

That's the spirit

> *"I'd estimate we've probably saved 5-10% on seed usage."*
>
> GEORGE BAKER

How long does it take to find the perfect drill? One farmer spent three years searching for the ideal establishment tool until coming across the Väderstad Spirit. *CPM* discovers what makes this drill special and how it's reduced seed use during its first season.

By Melanie Jenkins

Operating a 400ha mixed farm at Foxes Farm in Creeting St Mary, Suffolk, George Baker spent three years looking for the perfect new drill to run on his diverse soils until he came across a Väderstad Spirit.

Working mostly owned land alongside some contract farming, George's aim is to expand the contacting which means having the right tools for the job and in particular, one that's up to operating across variable conditions.

Growing combinable crops such as wheat, barley and beans, George also produces sugar beet, has a poultry unit and beef herd which he runs along with his father, Andrew. "We used to produce pigs, but we've moved away from this and want to push the arable side of the business more."

Using high levels of farmyard manure and pig and turkey muck means George prefers to take a mixed approach to tillage, ploughing where necessary. "It all depends on the year – during a good, dry year we'll min-till but if it's wet then we'll plough more."

The varied soils he has to contend with also provide a significant challenge. "Our soils literally go from one extreme to the other. We work sand right the way through to clay loam and although this is a challenge, I enjoy it and it helps to spread our workload."

BENEFITS OF FYM

"Drainage has been something we've really tried to work on but I'm positive that because we've spent 40 years putting FYM across every hectare of our land it's really helped us during the past few wet years. When we take on new land we certainly find there's a noticeable difference," he observes.

Another obstacle for George to overcome is tailoring the rotation to manage weed control. "The new herbicide chemistry that's come to the market has certainly helped and supports us to produce more continuous wheat or increase the amount of barley we grow; we just can't grow oilseed rape due to it being such a gamble.

"Although beans are an option, the value isn't there, so one alternative is to finish our beef animals and establish more grass leys as a break crop."

In an effort to ensure the profitability of the arable side of the business, George has worked hard to drive efficiencies. "I've always felt that if you look after your

The perfect partner

George Baker spent three years looking for the perfect new drill to run on his diverse soils until he came across a Väderstad Spirit.

soils then they'll look after you. In the past we had a larger suckler herd and a lot of the heavier land was down to grass, which I think has contributed.

"But machinery is getting larger now and while there's a drive towards direct drilling, it only works on certain soil types. Our soils vary so much we just can't commit to it, hence we decided to invest in the Spirit."

The drill arrived on farm in late spring 2024 as an ex-demo machine. "It happened to be on a farm up the road when I saw it, and I liked that it could help us to undertake more variable seeding and potentially allow us to improve seeding accuracy, so decided to purchase it.

"Apparently it's pipped as a light land drill but I've found that it works well on all our soil types and in nearly every different condition, whether it has to deal with straw or ploughed and pressed land – I've even direct drilled some grass seed with it," he notes.

"I knew I wanted to drill well into good seedbeds, so when looking for a drill I started to assess other aspects such as the SeedEye for accuracy of seed placement and this is largely why I took a bit of a punt on the Spirit," explains George.

"And due to the seed counting technology of the SeedEye, I'd estimate we've probably saved 5-10% on seed usage compared with our previous drill because it's so accurate in its handling," he observes. "I've certainly noticed it's saved seed both in the autumn and the spring."

IMPROVED PRECISION

"Previously, I've used everything I've ordered but I now have several bags left over. I think this is because it's gone from being applied on a metre square basis to only applying the exact amount of seed I want."

But because this is George's first season with the drill, he says he didn't quite trust that the technology would count the millions of seeds it processed accurately enough to reduce his planting rates. "Next season however, I'll certainly reduce them and include more variable seeding in my management. I feel the two will work really well hand-in-hand with this drill and I potentially think it could result in me taking tonnes off the seed order.

"As the saying goes, 'well sown is half grown', and I've never had wheat look as good as what we've planted with this drill. This is despite the fact it's been a very dry year overall. There was one field that was very wet when we drilled it but even there the crop is even across the board."

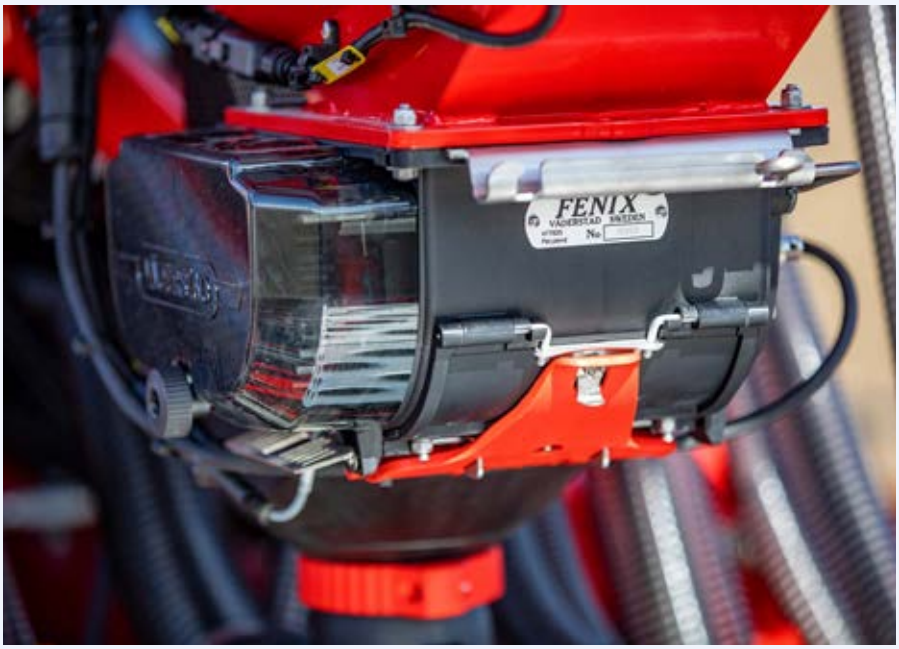
George likes that the operator doesn't have to calibrate the drill but instead the technology automatically adjusts seed-to-seed or even bag-to-bag, and whether there's a seed dressing or variable specific weight. "The machine works this out itself – it's one heck of a piece of kit." ▶

Seed saving

The SeedEye system on the Spirit drill has helped to reduce seed use compared with the farm's previous drill.

A closer look

Examing the technical features of Väderstad's Spirit



Simple adjustments
The Spirit features a Fenix II metering system which is an electric system to simplify adjustments between seed types.

Väderstad's Spirit 600 is a 6m pneumatic seed drill designed to prepare seedbeds and consolidate seed. The firm's Andrew Gamble highlights that although it's often perceived as a lighter land drill, this is in fact a myth. "We've always attested that it's a medium to heavy land drill but on the heaviest clays it may require further tilth creation so it can close the slot."

The front system features a Disc Aggressive, similar to a Carrier and with the same disc profile, explains Andrew. "This is there to produce tilth, remove weeds, lumps and clods and create a seedbed."

To consolidate the seedbed, staggered wheels then pack ahead of seed placement. The staggered set-up helps to prevent the bulldozing of soil which happens when wheels are lined up, and the wheels are set at a wider width to allow for an improved weight footprint.

The 380mm coulters are hydraulically controlled to produce up to 80kg of pressure, says Andrew. "The double disc system allows for the first disc to cut the slot while the second opens it. The seed is then slotted into the furrow before the shaft so it's not dropped into contaminated soil off the back of the disc."

OPTIMUM WORKING

The wide coulter wheels help maintain working depth and the following harrow works between the seed rows to preserve moisture. "I always call the drill a power-harrow combination but we're doing everything mechanically: creating the seedbed, consolidating it, running coulters through this and then pressing behind these – it's a very traditional system," says Andrew.

On the S version of the machine the 5000-litre hopper is a single tank but on the C models this is split for the combined application of seed and fertiliser, either at 50/50 or 60/40.

The drill features the Fenix II metering system which is an electric system to simplify adjustments between seed types, and connected to the SeedEye system it can minimise calibration, adds Andrew. "The fleeted rollers are simple to change depending on seed type, whether growers are drilling oilseed rape or beans."

The SeedEye system itself will count and calibrate seed on the move, accounting for 100% of the grain weight and adjusting for any inaccuracies. It has real-time blockage monitoring which alerts operators to any obstructions and allows them to make adjustments from the cab, he comments.

E-Services allows wireless access to the machine via an iPad located in the cab whereby operators can monitor every coulter, input maps and control tasks. "It's cross-platform compatible so will work with whatever tractor brand you're operating."

The Spirit also features contouring coulters to improve accuracy on hilly terrain, as well as automatic headland management and half-width shut off, says Andrew. "In addition, the oil is constantly running to maintain pressure, turning on and off when required."

Preserving moisture
The wide coulter wheels on the Spirit help maintain working depth and the following harrow works between the seed rows to preserve moisture.

The previous drill George ran was a Horsch Pronto and although a similar concept to the Spirit, with discs and rear coulters, it couldn't handle the conditions during the especially wet season of 2017/18. "After this we moved to a mounted Lemken coulter drill and then to a combination setup with the same drill on the back of the tractor. We still have this and use it to drill spring barley, but so far this year we haven't used it at all because the Spirit has been more than capable."

George anticipates purchasing a tine drill for use as a back-up during wet weather, but expects this to only be used when conditions are really bad and therefore nothing else will run. "This past winter we were able to drill everything except 40ha with the Spirit and I'd honestly thought that due to the wet conditions it wouldn't even come out of the shed."

Because he'd previously run a combination drill and knew the Spirit was a similar concept, George was confident the drill would be able to work well across his land. "One thing I liked about the spirit compared with our previous drill was the amount of pressure we could put on the coulters which is up to 80kg. So although purchasing the drill was a bit of a gamble, I knew it was equipped to do what I wanted it to on our heavier land and with it being a Väderstad, I knew it was going to be a good well-built machine."

And while George had anticipated having to work more of the soil in front of the Spirit, this hasn't been the case. "It does a remarkable job whether it's on our lighter or heavier land."

The Spirit is usually pulled using a Cat Challenger 745 which produces 270hp. "We've also operated it behind a Fendt Vario 718 which has 180hp and did manage to pull the drill in wet conditions. The Spirit is so much lighter than our previous drill, coming in at 5.5t empty it's half the weight of the Lemken. This also means that it's probably costing us at least 20% less to run and we're getting no less drill either."

The kit hasn't been without teething issues, but these have been minimal, he adds. "The only problem has been with one of the folding sensors which is perhaps over-engineered. It sits behind the tyre packer and so clods of mud flick onto it and then the drill wouldn't fold. However, this only required a minor adjustment and was simple and easy to solve."

Overall, George finds the Spirit a well-thought-out machine with a good-sized seed hopper. "I also like that I can use an iPad to set seed coulter pressure and adjust the front tool depth, making the machine really accessible."

As far as producing a return on investment, George argues that because the farm required a stock machine, it's already done this. "I also think that as a Väderstad machine it'll hold its value. Plus running costs are fairly low at the moment and alongside the seed saving, it's already proved its value – I've been very impressed so far."

Drilling in all conditions

The Spirit has been used to drill autumn and spring crops at Foxes Farm and has proven capable across different soil types.

Talking TATIES

WITH ANDREW WILSON

Down memory lane

A memory popped up on my social media recently from back in 2011. It was a simple post wishing for rain – father had seen one of our neighbours irrigating cereals and had come home with aspirations of similar activities.

Economics were a little different even as recently as 2011, but I'm hoping said reminiscence is a good omen – 2011 was one of our best potato years in my 30 years growing them! Optimism in this job is essential...

As I write this, we're finishing planting our 2025 crop. We've had our challenges as ever but it's been easy as far as weather is concerned – soil was warming up by the time we started and we've managed to not let anything bake out.

One field took a little more patience and fuel than the others and was notably the only one without a cover crop on it during winter. Coincidence? I think not – despite our covers looking pretty poor on the surface, the important work is done underneath, and it's been refreshing to cultivate less than usual. The bulk being done by an old shakerator with a Metcalfe leg conversion, and a Simba TL cultivator.

The plough and bedtiller have been out of the shed too but haven't done a huge area. My policy is as little as possible but as much as necessary, when it comes to cultivation. Retaining moisture has been key – usually we're trying to dry land out.

This season has seen a few firsts, broiler litter being one of them. I was after something to give our crops some get up and go, and following research and a good local contact, we made it happen. This may be something we use strategically in our rotation as well as in potatoes if we can get a few practical details polished up.

We've made a few tweaks to in-furrow encouragements aimed mostly at root health and rhizoctonia defence. We've meddled with things like destoner pitch a few times during the years but always come back to 42mm, and aim to not overwork soil to a point where the cross conveyor runs empty in a bid to enhance row structure without creating bother for the harvester.

Seed is an area we have little control over. Generally seed destined for chitting comes to us in February, we treat it if necessary and crate it up with an aim of physiologically aging it by c.250 day degrees by the time it's planted.

This year being early, it just about hit 200 day degrees, but went into the ground with a 3mm chit in good order. The remainder of seed usually arrives a month or so later and is decanted into tonne boxes, but this year we've had to resize some of our stock.

Technology is inevitable, but sometimes, just occasionally, the old ways are the best. I've no wish to dust the old sippit off, but screen sizing potatoes has worked perfectly well for longer than I've been on the earth.

Our last field planted has seen a flurry of acronyms in action. VESS and STIR have been calculated, and EiQ, alongside fuel use, carbon footprint, resource utilisation and yield versus inputs calculated will follow in due course. We're ankle-deep in nature-friendly potatoes to the next level on this particular farm. We're pushing the boundaries on a small area with companion plants and natural cover alternatives too. A step too far? We'll see!

In other news, spring corn mostly looks decent albeit thirsty, and I'm pleased I pushed on sowing when I did, and that I applied its fertiliser immediately pre-drilling. This was to incorporate it into the seedbed with the drill and minimise volatilisation, even though it was cold at the time. I was a little nervous when my tender spring barley was enduring a daily frost a month ago.

Some of my wheat isn't quite as good looking and I can see an odd tuft of blackgrass appearing if I look hard enough.

As for beet, well it had as good a start as any beet crop we've sown, but drought and wind are clobbering it at the moment. Placed fertiliser still looks worth the hassle, but the companion crop? My agronomist isn't convinced – his eyes noticeably rolled when he saw I'd relented and drilled about a third of my beet area with a light barley cover.

As the field is by the side of a popular public footpath, said cover has piqued the interest of a few locals, confirmed by a few 'what's happening in there then?' questions at our village Mayday event recently. It's nice people are interested in what we're up to and good to talk farming with the public.

Slightly less positive is the beet futures price currently and the doldrum territory of the grain markets, but let's not dwell on something that's invariably not static for long in any position these days.

The next few weeks will see Dan's induction, pre-harvest machinery maintenance, irrigation systems set up, pollinator strips sown, and some farm roads see the same 'keep on top of the little jobs before they get big' philosophy.

I'm also on with making a few drainage maps for fields where they're absent, it's not often drain lines are as visible as they are this year; was the last time 2011? ●

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

Winning the war on virus vectors

A new insecticide featuring translaminar and contact activity is set to improve aphid control in root crops including sugar beet and potatoes. *CPM* learns more about Sivanto Prime.

By Rob Jones and Janine Adamson

In a world where the chemical crop protection armoury appears to be rapidly shrinking, particularly when it comes to insect pest control, the successful introduction of a new insecticide may come as a surprise to some.

However, the launch of Sivanto Prime (flupyradifurone) is very much a reality, with the product available to use this season; promising to help protect root crops from virus-carrying aphids.

Introduced by Bayer, flupyradifurone belongs to the butanolide class (IRAC group 4D) and was granted authorisation in March this year. Although the active ingredient has been available across the European Union since 2017, Sivanto Prime is the first product authorisation for use in Great Britain and Northern Ireland.

The label stipulates it can be applied once per season to the following crops: sugar beet, fodder beet, potatoes, carrots, combining and vining peas, and field beans. Whereas in terms of control, it has claims against the principle virus vectors, notably peach-potato aphid *(Myzus persicae),* potato aphid *(Macrosiphum euphorbiae),* black bean aphid *(Aphis fabae),* pea aphid *(Acyrthosiphon pisum)* and willow-carrot aphid *(Cavairella aegopodii).*

According to Bayer's Tom Astill, an important feature of Sivanto Prime is

Product benefits

According to Bayer's Tom Astill, Sivanto Prime has shown activity on both immature and adult aphids through contact and ingestion, offering protection for around seven days.

that it's shown activity on both immature and adult aphids through contact and ingestion, offering protection for around seven days. As such, he believes it'll be welcomed by growers.

"Sivanto Prime delivers quick knockdown activity and has translaminar mobility to control a range of aphid species while featuring a favourable environmental profile that's selective to beneficial predators including parasitic wasps," he explains.

"This is likely to be a useful tool for root crop growers for whom virus represents a serious risk to yield and quality. Trials indicate that once an aphid ingests or comes into contact with Sivanto Prime, feeding stops within two hours, with control evident from around two days post application."

PRACTICAL ADVICE

To further support the advice given to growers, Bayer has investigated Sivanto Prime's activity with and without the inclusion of methylated vegetable oil, Mero, says Tom.

"In sugar beet trials there was little apparent benefit from the addition of Mero for control of either peach-potato aphid or black bean aphid. In potato crops however, the addition of Mero improved control by around 15% compared with Sivanto Prime alone. Notably, the addition of Mero resulted in better control than was seen with the mineral oil, Cropspray 11-E," he comments.

Until the recent introduction of Sivanto Prime, sugar beet growers could select from either Teppeki (flonicamid) or Insyst (acetamiprid) for the control of aphids.

And while pyrethroids such as lambda-cyhalothrin remain an approved option, their value is considered negligible as most peach-potato aphids are resistant to the chemistry, points out Tom. "Their less selective profile on aphid predators and parasitoids is also seen as a negative," he adds.

Deciding when to apply Sivanto Prime for optimum effect is perhaps easier to determine in sugar beet than potatoes, suggests Tom. "This is due to the limited insecticide options available for use in sugar beet crops. With the unsuccessful application for an emergency authorisation for the seed treatment thiamethoxam (as in Cruiser SB), the first foliar insecticide could be Sivanto Prime.

"Bayer trials show the product has knockdown activity, therefore we suggest positioning it as the preliminary spray

Urgent call for CIPC residue data

Another batch of samples is required to ensure the CIPC tMRL can remain

CIPC was a staple in potato sprout suppression for decades but the legacy residues it leaves behind are putting UK storage capacity at risk. That's according to GB Potatoes' Graham Bannister, who stresses that it's critical the industry continues to supply monitoring data.

It's required because as of 10 April 2024, the Chemicals Regulation Division (CRD) set a temporary Maximum Residue Level (tMRL) for CIPC at 0.35mg/kg. As this threshold is reviewed annually, its continuation depends entirely on whether the industry can provide evidence that it's still necessary, explains Graham.

"If we can't demonstrate that a tMRL above the limit of detection (0.01 ppm) is still required, stores with historic CIPC use may no longer be usable. The consequences for growers, packers, and the wider supply chain would be significant."

Data collected last year suggests that without the tMRL, 22.5% of storage facilities would have exceeded the detection limit, meaning they wouldn't have been permitted for use had the limit been set to the detection threshold.

"That's why it's so important to keep the data flowing," adds Graham. "Most growers already have access to the necessary data through the likes of customer testing of potato samples, or Red Tractor certification sampling."

Equally, this is where the CIPC Residue Monitoring Group (CRMG) steps in – coordinating the anonymised data submission to CRD on behalf of the entire industry. To submit data, send it to Adrian Cunnington at adrian@potatostorageinsight.com – this will then be anonymised before being submitted to CRD.

Make or break situation
If it can't be demonstrated that a tMRL above the limit of detection (0.01 ppm) is still required, stores with historic CIPC use may no longer be usable, stresses GB Potatoes' Graham Bannister.

Importantly, for the 2025 CRD submission, CRMG requires at least 125 new samples. "If you have potato stores previously treated with CIPC and are holding crops for at least two months this season, please provide at least one of your regular multi-residue test results," requests Graham.

The form can be accessed via https://www.gb-potatoes.co.uk/

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to control the first colonising aphids."

He believes it makes 'practical sense' to use Sivanto Prime first because both Teppeki and Insyst have a later window of application. "As Sivanto Prime and Insyst are both IRAC group 4 insecticides, ideally they shouldn't be used in consecutive applications. Instead, Teppeki could be used as the second spray with Insyst reserved for use as the final spray if required," suggests Tom.

In potato crops he says an application of Sivanto Prime earlier in the programme could also be beneficial. "Sivanto Prime can be applied in potato crops from 10% of plants meeting in rows (BBCH 31) up until senescence, but in all registered crops, it mustn't be applied after 13 July."

COMPLIMENTARY OPTION

According to Tom, with proven activity on peach-potato aphid, potato aphid and willow-carrot aphid, Sivanto Prime should complement existing insecticide options particularly where there are populations with reduced sensitivity to pyrethroids.

He highlights that potato growers also have the option of Movento (spirotetramat) which is IRAC Group 23. "Movento provides lasting protection and benefits from being selective to many beneficials; there's no evidence of resistance within the target aphid group.

"It can be applied in all varieties of potato, however, can only be applied after flowering (in flowering varieties)," he reminds.

So where does Sivanto Prime offer the greatest contribution to crop protection? It largely depends on the timing of infestation, believes Tom. "On one level, it offers excellent flexibility due to its wide window of application, short harvest interval of only seven days and good knockdown activity of a wide spectrums of aphids.

Target species

Sivanto Prime has label claims against the principle virus vectors, notably peach-potato aphid *(Myzus persicae),* potato aphid *(Macrosiphum euphorbiae),* black bean aphid *(Aphis fabae)*, pea aphid *(Acyrthosiphon pisum)* and willow-carrot aphid *(Cavairella aegopodii).*

"On the other hand, it can be applied only once per crop and its relatively shorter persistence of seven days means it is best applied when populations are at threshold levels and before they reach heavy infestation," he adds.

For most growers across Great Britain, Potato Leaf Roll Virus (PLRV) is the most prevalent aphid-borne virus. The peach-potato aphid is considered the most efficient vector of PLRV and Potato Virus Y (PVY), presenting a crop protection challenge as pyrethroids now offer little protection against this species, with limitations on the use of other insecticide products.

Tom highlights that although not a colonising aphid of potato crops, the willow-carrot aphid is a vector for PVY and numbers typically spike when the pest migrates from willow trees and carrot crops (once straw applied to carrot crops for frost protection is removed in the spring). "Willow-carrot aphid populations exhibit moderate resistance to pyrethroids," he says.

The Rothamsted Insect Survey (RIS) aphid forecast provides an informed assessment of when virus-carrying aphids are likely to pose a threat to crops. Research has shown it's mostly the temperatures in January and February which have the greatest impact on the start of aphid flights for those species which survive past the winter in their active stages, such as the peach-potato aphid and potato aphid.

This winter, Scottish sites monitored as part of the RIS recorded January to February air temperatures in line with the long-term average. Further south, temperatures were around 0.5°C cooler than average from Kirton to Wellesbourne, and 1.0°C cooler from Rothamsted to Silwood Park, with Starcross being around average.

According to Rothamsted Research, this suggests the first aphid flights may occur around average timing in Scotland, but 1-2 weeks later than average across much of England. Additionally, when compared with the past 10 years of weather data, most cities south of Newcastle would be expected to be around two weeks later, it notes. ●

Potato virus vectors

The peach-potato aphid is considered the most efficient vector of both Potato Virus Y (PVY) and Potato Leaf Roll Virus (PLRV).

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The case of the enigmatic wireworm

> *"There are ways we can control wireworm, but currently, we're not doing it very well."*
>
> MARTYN COX

According to experts, knowledge gaps remain in understanding wireworm biology and how best to achieve control of the pest. *CPM* finds out how work is taking place to help fill that void.

By Mike Abram

For a pest that's been around 120M years, you'd be forgiven for thinking that all must be known regarding wireworm.

But that's far from the case, and with the revocation of Mocap (ethoprophos) five years ago, it proved a catalyst for researchers, growers, and agronomists to take another more detailed look at the pest which is causing significant problems in crops such as potatoes, carrots and onions.

As such, a lot has been learned in the meantime which calls into question some commonly held beliefs about wireworm – not least that it's a pest simply caused by a history of grass in the rotation.

Older information implies that 5-10 years of grass is required to build up damaging populations, or at least a recent history of grass in the rotation. However, independent agronomist and wireworm researcher, Martyn Cox, suggests that in the right situation, just one year of wheat in a rotation is enough to build a wireworm population that can damage sensitive crops.

He highlights that another common belief is that ploughing reduces populations, but again, it's not the whole story. "I've found populations of wireworm high enough to damage potato crops on farms which establish three cereal crops in between with the plough. Those fields have never been in grass," says Martyn.

Typically, wireworms like good, productive soils with high organic matter, and are less likely to be successful in very sandy soils. "You can nearly always guarantee they'll be in the moisture-retentive parts of the field," he adds.

"There are ways we can control wireworm, but currently, we're not

Optimising cultivations
Cultivating robustly immediately after a cereal harvest could help to reduce the risk of wireworm, highlights independent agronomist and wireworm researcher, Martyn Cox.

doing it very well," suggests Martyn.

He says knowledge of the pest's life cycle helps – adult click beetle have a relatively short period of activity between April and July with egg laying taking place in May and June.

However, within that general picture lies a lot of unknowns. "We don't know how long eggs take to mature in females, or hatch, or if it differs between species. Ideally, we'd model egg development in females in each major species according to time and weather."

Hatching success depends on having some moisture and food for the juvenile to feed on, as well as a suitable crop, which includes cereals, for egg-laying. Assessing likely success for each year in the rotation leading up to a potato crop can be an important risk assessment tool, says Martyn.

He adds that the period immediately after egg hatch in late summer into early autumn is a key opportunity to reduce populations. "They're very susceptible to dehydration, cultivation, predation, and starvation. But we don't know how long this period lasts."

Another opportunity is the 2-3 week period around July when wireworm pupate to become adult, when again they're sensitive to being flattened during inversion cultivation, or exposed to predators by being on the soil surface.

Based on an assumption that wireworm remain larvae for four years before pupating, this means the larvae which hatch four years before a potato crop will likely pupate in that crop, and it's the wireworm in years two and three post hatching that'll likely make up a significant portion of the damaging population which feed on tubers through August and September.

But research in Switzerland indicates 60% of its *Agriotes sputator* (common click beetle) complete a life cycle in just three years, for example, while other work indicates *Agriotes obscurus* (wireworm click beetle) can complete a life cycle in just 14 months at a constant 20˚C.

"This is a critical knowledge gap, and if we're wrong, it limits attempts at IPM," stresses Martyn.

Managing the period between potato crops is critical in reducing the threat of wireworm, with cereal crops two or three years before potatoes likely to increase risk as a conducive crop to egg laying, compared with sugar beet or other broadleaf crops which don't suit click beetle life cycles.

Other risks in that period of the rotation ▶

***Agriotes* genus**

The most well-known wireworm are from the *Agriotes* genus – *A. lineatus*, *A. obscurus* and *A. sputator.* *Photo: Fera.*

Enigma I project: helping to unravel wireworm unknowns

How tackling gaps in wireworm knowledge has formed the basis of a commercially-funded research project

The goal of the Enigma I project is to understand improved ways of managing the threat of wireworm. One part of this has been simply identifying wireworm species – although there are around 70 species in the UK, only five or six are crop pests.

The most well-known are from the *Agriotes* genus – *A. lineatus*, *A. obscurus* and *A. sputator.* Species from the genus *Athous* and *Hemicrepidus* can also be a problem, but *Adrastus*, for example, doesn't appear to cause damage despite being relatively easy to find in some East Anglian soils, explains independent agronomist and wireworm researcher, Martyn Cox,

"We had 120 *Adrastus* in 12 bait traps this spring in a field where we planted Maris Piper and there was no damage when we lifted the crop in October."

Unfortunately, not only is it virtually impossible to visually detect the difference between *Agriotes* species, it's also difficult to visually differentiate between some of the UK *Agriotes* and *Adrastus*.

That's why one of the first tasks of the Enigma I project was

DNA barcoding

One of the first tasks of the Enigma I project was to develop a method using DNA barcoding to identify the larvae, explains Fera's Dr Larissa Collins.

Click beetle

Adult click beetle have a relatively short period of activity between April and July, with egg laying taking place in May and June.

▶ are short-term leys and spring cereals followed by green cover, with natural regeneration enough to cause a potential later problem, highlights Martyn.

Therefore, cultivating robustly immediately after cereal harvest could help to reduce risk. "You must keep it clear of vegetation for a month after cereals – if you don't, you'll still have wireworm."

He adds that control options in potatoes are limited. "In most fields, around 10-20% of the area will be at the highest risk from wireworm. If you can identify where that is, and we frequently can, then you have options such as avoiding planting or changing the rotation plan."

Chemical options in the future could potentially include a product based on tefluthrin from Syngenta, which looks promising in some trials, says Martyn, while of the biological products, entomopathogenic nematodes appear to perform better than entomopathogenic fungi.

"But it's the crops grown in the two, three or four years ahead of potatoes that most influence risk," he comments. "So we must identify what the best strategy is for a rotation – which crops enable a life cycle to start and which negate that success. There's still a lot to learn," he concludes. ●

to develop a method using DNA barcoding to identify the larvae, explains Dr Larissa Collins, an entomologist from project lead, Fera.

After trapping and sweep netting adult click beetles, Fera sequenced their DNA to create barcodes for 16 UK and French wireworm species.

In future, Fera hopes to extend that principle to use metabarcoding to identify wireworm species from soil samples. The difference is, barcoding is similar to scanning one item at a time in a supermarket, while metabarcoding is scanning the whole trolley, explains Larissa.

The project is also answering questions regarding the range of each species with the help of project partners, including Martyn's company Blackthorn Arable, Pearce Seeds, G's Growers and Syngenta, using pheromone traps to capture adult click beetles. The information gathered has been plotted on a map.

DOMINANT SPECIES

"There are different distributions across the UK – we have two *Agriotes* species in Scotland and three across the rest of the country. Once you're north of the Humber, you lose *Agriotes sputator*, which is the dominant species in East Anglia," says Martyn.

Larissa's team has also been modelling the results from laboratory work to understand how climate change might alter those distributions. "It varies a lot by species. There's one species we expect to expand its range by about 30% and another one by only 10%," she says.

"Species also responded differently to temperature in the lab work, with some speeding up life cycles more than others, so we'd expect those species to become more of an issue."

That information will be crucial for control strategies, she highlights. "If you're using integrated pest management, using biological controls, and working through rotations, it's important to understand which life stage the larvae will be at and when."

For example, small larvae are easier to starve and are more susceptible to soil tillage, while biological controls such as entomopathogenic fungi are more effective on larger wireworms, she adds. "IPM is different to traditional chemical control – you have to understand pest biology more."

Building greater knowledge around risk factors for wireworm plays into that she says, which is why the project collected field data about each click beetle capture to see if there were correlations between catches of different species and particular risk factors.

FIELD DATA

Aspects such as field history of grass, pasture in adjacent fields, organic matter applications, nearby water sources, soil pH and type, vegetation type near to field, and field aspect were among those analysed, continues Larissa.

"We found some good correlations between where we found adults and those risk factors, but they differed depending on species. For example, the three *Agriotes* species responded differently to some of those risk factors."

Ultimately, this work should help growers to make decisions about what to plant based on risk factors identified, she suggests, although the details around this and other findings from the research remain confidential to the project partners (see box).

A follow-up Enigma I project aims to fill more gaps in knowledge, including trying to link adult click beetle catches to future wireworm populations, as it's easier to catch adults than find wireworms in the soil.

A second aim is to analyse the gut contents of wireworms to identify what they feed on, and also that of their potential predators such as carabid beetles, to see if they're actually feeding on wireworms, says Larissa. "We also want to see if there's an interaction between different cover crops and seed mixes, predators and wireworm populations."

Further research will also look at the impact of biological and non-chemical control agents in UK conditions, she concludes.

The ins and outs of commercial research

Commercially funded projects have taken on added importance following the demise of AHDB Potatoes and Horticulture, mainly in striving to fill a research funding gap. As such, vital work such as Enigma I can continue.

Initiated due to increasing inquiries from industry regarding wireworm damage, this commercial drive should ensure Enigma I is directly relevant to solving practical problems. This is because its commonly perceived that commercial projects can be more flexible and less encumbered by bureaucratic processes than those relying on government funding, allowing quicker adjustments in research direction.

For those involved it should provide first mover advantage and benefits to their businesses, including knowledge fostered through collaboration and shared learning.

But as highlighted during research for this article, a significant drawback for the wider industry compared with a project funded through AHDB or government, is the limited dissemination of results. For example, in Enigma I, results about wireworm correlation with field specific factors or which cover crop reduces wireworm incidence, are the protected intellectual property of the project partners.

This may lead to frustration that useful information isn't being shared as broadly as it could be, limiting and delaying the impact in the wider industry.

One possible solution could be to create subscription services where growers can pay for specific information, although this still has the concern of equitable access, particularly for smaller farmers or businesses.

But without the unlikely event of a similar organisation to AHDB evolving with the funds and capacity to fund and coordinate public research projects, such commercial endeavours with these restrictions are likely the new reality for potato and horticultural crop growers.

LASTWORD

WITH JANINE ADAMSON

The age of contentment

There are so many instances where I'm reminded – despite how young I feel at heart – that I've slowly morphed into the next era of my life. While a more youthful Janine may have felt exhilarated at the prospect of a cheap wine-laced night on the tiles, the current iteration takes great pleasure from the sight of a pair of bullfinches on the garden bird feeder.

I catch myself complimenting someone's luxurious wool Berber carpet, selecting a shoe based on its bunion sympathy levels, scrutinising the thread count of bed linen (even better if it's Egyptian cotton), chastising motorists exhibiting road rage, especially if it's a Sunday. And you know the best part? I really don't give a fig.

Although I feel far from qualified to master the concept of adulthood, it would appear that I have indeed grown up. And it's the quiet confidence that comes with maturity which I'm enjoying the most.

Maintaining inner peace has become a priority – thus I proactively choose to sweat even less of the small stuff. Rather than begrudgingly say yes to a social occasion which really doesn't float my boat, I opt to sit it out in my lifejacket indulging in a share bag of luxury crisps and Classic FM.

I've abandoned any fashion-related inhibitions and adopted what's coined 'dopamine dressing' – this includes donning a bright lime green fuzzy coat nicknamed 'The Kermit' and footwear from a collection labelled 'shoes my husband hates'. I jest, he's simply not keen on Dr Martens, despite the kindness they offer one's metatarsal.

Life goals now include attending Glyndebourne Festival, owning a modest motorhome and finally scoring enough Morrisons More card stamps to cash in for a 'free' item of lidded Pyrex. Each would undoubtedly offer a varying level of joy.

However, this clarity of mind is a relatively new concept. If someone asked me to re-live the torment of my 20s, I would wholeheartedly, and perhaps not so politely, tell them to do one. Oh the drama and uncertainty – why does no one warn you that it'll be one of the most ricochetingly ridiculous times of your existence? Bouncing from one chaotic crisis to the next?

Well, that's how it was for me. The juxtaposition of living life as a fully-fledged grown-up yet having very little experience of how to do so. Plus so much change – from leaving home and working to establish a fulfilling career, to hopefully settling down and finding 'your' people. At the end of the day I had little clue about who I truly was, and it probably showed.

It's not until now, in my late 30s, that I'm starting to understand what it takes to achieve contentment, and a contributory factor towards this has undoubtedly been therapy, which I'm not afraid to admit.

Talking to a professional has been one of the most bountiful investments I've ever made. It's allowed me to bury the skeletons residing in my closet, off-load more baggage than Heathrow's lost luggage department, and has helped steer my trajectory towards the path of self-acceptance.

However, it's also been emotionally draining and one of the toughest tasks I've ever set upon. Soul-searching isn't a pleasant amble in the park, at times it's similar to wrestling a shark while in an electrically-charged swimming pool filled with jelly cat food. It takes you to the places from your past which you'd rather poke pins in your eyes than revisit; it can be rough.

It requires a whole new level of commitment, and while I'm nowhere near perfect, my mind is now far better equipped to overcome life's undulations... albeit I'd rather avoid a riptide. I also have a huge sense of gratitude for the person I've uncovered during the process; it's been worth every penny.

So although my forehead is starting to resemble that of a shar-pei, and my hairdresser has taken to snipping greys out when I'm not looking, I'm starting to believe those who state growing old is a privilege – evidence suggests, this could be the case.

Through life experience and a conscious effort to work on myself, I've gained the confidence to express who I truly am which is cathartic indeed. I'm unsure if I'm early or late to this party, but with no time to waste, I'm extremely pleased I've had this epiphany.

I never wish to seem evangelical in my musings for this column, but if you feel you're at a crossroads in your life, it might be worth opening up that conversation with someone. Either way, it's an investment which will always return. ●

As displayed by mini me, a good dose of dopamine can always be found in a snazzy outfit.

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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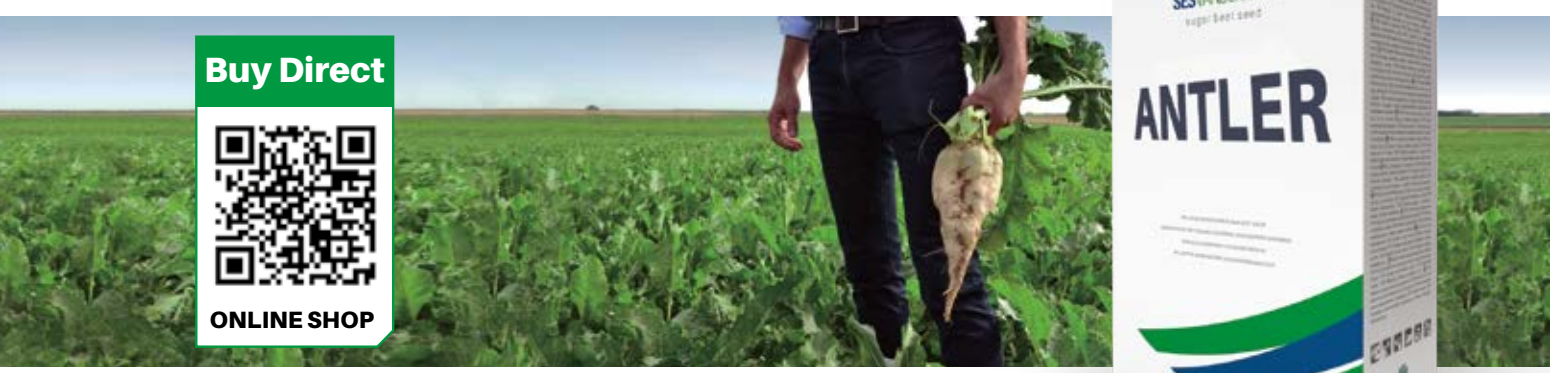

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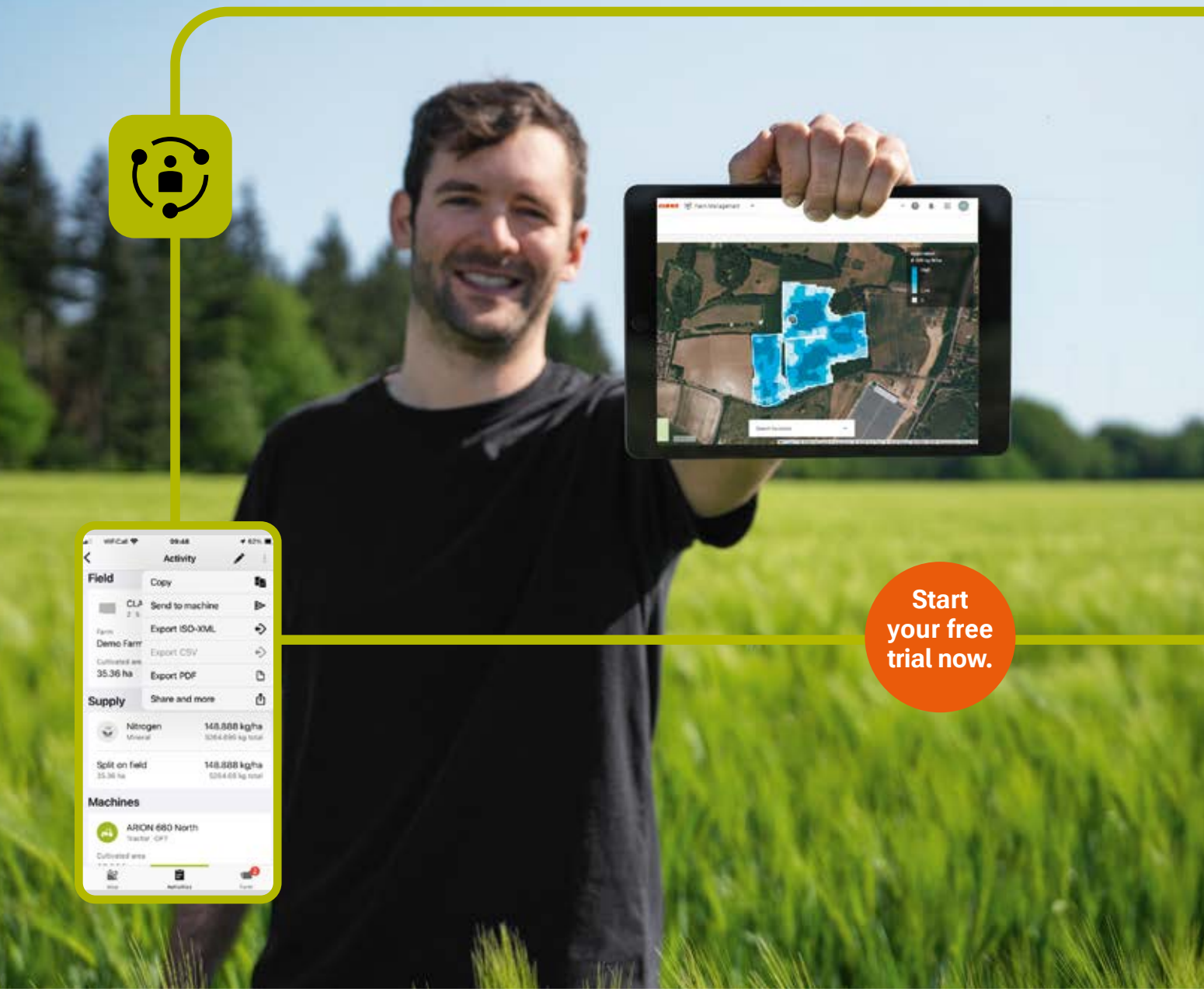

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