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**Juggling pulses
and SFI
Page 46**



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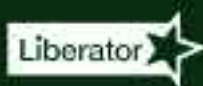
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Editor's Pick

By the time you receive this magazine, we'll be heading towards the end of June thus half way through the year. It really is frightening to say the least how quickly time goes when you're an adult. I guess it makes it even more important to try and live in the moment and enjoy the here and now.

We can all be guilty of wishing our lives away — constantly chipping away towards the next significant milestone or event. That's even more prevalent when you work in a trade which involves monthly deadlines; I'm constantly chasing the next issue.

However, here's my opportunity to reflect on what lies directly in front of me — the June issue of *CPM* — although of course at the time of print, I'll be a good way through July!

Let's start with our cover story (page 46) which is written by Charlotte. In what likely won't come as a surprise, experts are warning that without careful planning, legume-containing SFI options could have a negative impact on the long-term prospects for pulses.

Now, I'm not a fan of scare-mongering readers, but I do think it's important to explore concerns which are being raised across the industry. Pulses have much to offer in a traditional sense, so unlike my quest to live in the moment, this is an area which definitely requires adequate forward-thinking.

Another topic which may take some pondering is sulphur, and how treating it in a similar way to nitrogen can help to maximise its potential. Because not all sources are the same, we take a closer look including the pros and cons of different options (page 7).

It's that time of year where we talk a lot about varietal choice which you could say is at the heart of this issue. From profitable wheat (page 19) to conventional oilseed rape (page 33), there's plenty to read up on.

As part of this, Melanie

continues her Insider's View series, this time shining a light on Beowulf (page 22) and Maverick (page 36). Variety names often put a smile on my face, if only because it allows Melanie to be creative with her article intros.

Then on page 50 we investigate first-time maize growing for arable farmers. Being from North Staffordshire, maize is a crop which I'm actually familiar with. Whereas I've personally never encountered block-busting wheat around here (I'll be gladly proven wrong and welcome an invitation to see), maize is like a comfort blanket. Plus with the income from SFI options, it's become a far more compelling crop.

As well as all of the crop variety content, June also means its show season. Alex Cherry gives *CPM* a sneak peak of what lies in store for Groundswell (page 56), from infrastructure upgrades to a new educational zone. We certainly look forward to visiting the festival.

As for the Machinery section of the magazine, we're mostly focusing on material handlers for this issue. Melanie investigates battery-powered options on page 70 whereas Martin Rickatson shares an on-farm view of a Merlo machine (page 75).

I understand not everyone has an interest in this part of the mag, but the team is striving to keep the content engaging through new angles and perspectives. As always, feedback and story ideas are welcome, just pop me a message.

To round-up in Roots, Mike Abram delivers the second part of his series on alternative approaches to sugar beet, this time looking at nitrogen trials (page 81). He also reports from the SPoT store event and reveals how advances in ethylene application could enable safe use in crisping and chip shop potato stores (page 86). After all, no one enjoys a sprouting spud.

Speak soon,

Janine



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smith's soapbox

by Guy Smith



1966 and all that

I've never been one to get over excited about elections, but when they do come around, I usually summon up the energy to troop to St Osyth village hall to put my pencilled mark against my selected candidate.

They seldom turn out to be the winning candidate, but nonetheless my civic duty is done.

My constituency is Clacton-on-Sea which used to be a quiet coastal backwater that didn't feature much in the political firmament during election night coverage.

In the Thatcher years my constituency would return the Tories and under Blair it duly returned Labour. But then in the 2010s, little old humdrum Clacton was suddenly thrust into the political limelight when UKIP identified it as the perfect launch pad for Brexit politics. To this day it's the only constituency to have returned a UKIP MP in the form of Douglas Carswell in the 2015 election.

Just as things returned to 'normal' with a Tory winning in 2017 and 2019, lo and behold in 2024 Clacton is back as an electoral focal point as Nigel Farage has expressed a dubious

determination to become its new champion.

As I write, he's just had milkshake poured over him as he strutted along Clacton sea front while encircled by a throng of cameras. It'll probably be as close to dairy farming issues as he's ever likely to get.

So what's all this to do with farming I hear you ask? Not much is the honest answer, but let's face it, UK elections never have much to do with agriculture. However, what is notable about this upcoming election, is that you could argue it's the first in my lifetime where agricultural policy will be the plaything of Westminster rather than Brussels.

While it's true that the 2017 and 2019 elections were post-Brexit, it's taken this long to shake the vestiges of the CAP out of the system. It's probably true to say it's the first election since 1970 — which put Ted Heath into Number 10 — where the winning party will hold the political strings that colour our fortunes as farmers.

More emphatically, if the polls are right, it'll certainly be the first election since 1966 that puts a Labour Government firmly in charge of English farm policy.

The 1960s were a rather long time ago — you'd have to be well into your eighties to have voted in the March 1966 general election. Very few today would recollect Fred Peart as Minister of Agriculture (N.B, why you don't get politicians called Fred anymore?).

Back then, the central building block of agricultural policy was the price support system whereby farmers would receive deficiency payments if key commodities such as wheat and barley failed to achieve target prices on the open market. On top of this, there were a myriad of grants for farm productivity improvements such as drainage, machinery purchases and hedge removal. It was a policy that could be traced back to the post-war Labour government of

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

1945 and was a policy that encouraged farm production.

For farmers of my grandfather's generation who farmed in both the pre- and post-war decades, there was a perception that farmers did better under a Labour government rather than a Tory one. This was possibly a generalisation which overlooked the Tory administrations of the 1950s, but it was true that the post-war Labour government embraced food production and UK farm productivity with a good deal more vigour than the pre-war Tory administrations.

Whether this political fervour for agricultural production can still be found in the Labour Party 50 years later, when for the first time in two generations they have the chance to write a Westminster-based farm policy, remains to be seen.

At the moment, our farm policy is dominated by schemes which pay farmers to take land out of production — it's a complete reversal of what happened in the post-war years. I'd argue this policy has been brought in by a Tory government that's made no attempt to properly understand the impact this will have on the UK agricultural industry or our food security.

Maybe, just maybe, 2024 will be a re-set year. Meanwhile back in Clacton, I suspect I'll be voting for a losing candidate again.

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Sulphur sources

While most arable growers appreciate the pros and cons of different nitrogen sources, the same thinking isn't always applied to sulphur. *CPM* investigates the productivity and environmental implications of current sulphur options.

By Rob Jones

Sulphur is being increasingly perceived as one of the most important elements in sustainable crop production — essential in optimising NUE, plant health and grain quality.

But confusion regarding the amount of sulphur in organic sources, the potential environmental implications of its use and the efficiency with which different forms are taken up by crops, can result in many growers missing out on the opportunities sulphur provides.

According to Origin Fertilisers' technical director Peter Scott, greater understanding of the different types of sulphur available and the role they play in crop production is essential if growers are to achieve the most from it. "Sulphur is a life-essential

nutrient for plants and animals and is required for protein formation, physiological functions including photosynthesis, and formation of oils, glucosinolates, hair and wool."

Critical sulphate

"Most major crops, including grass, require large amounts of sulphur in the form of sulphate," he explains. "Sulphate is negatively charged which means it isn't held on the exchange sites in soil clay and organic matter particles, so is easily leached, particularly from light soils and in high rainfall conditions."

Peter says despite its fundamental importance, he believes agriculture still doesn't give sufficient attention to sulphur nutrition in terms of how much, when and in what form. "This is reflected in the lack of detailed recommendations in RB209, but there's an urgent requirement to increase our knowledge of sulphur nutrition both individually and collectively, to improve on-farm practice," he stresses.

ICL Growing Solutions agronomist Scott Garnett agrees — he says latest soil testing by Lancrop Laboratories shows some 97% of UK soils are deficient in sulphur.

"While atmospheric sulphur was once abundant, control of pollution by heavy industry and other practices over recent years has now reduced this significantly, so growers have to include supplementary

“There’s an urgent requirement to increase our knowledge of sulphur nutrition both individually and collectively, to improve on-farm practice.”

sulphur in crop nutrition.

"Organic sources such as FYM and slurry contain very little usable sulphur, so without an efficient source of additional sulphur, nitrogen can not only be under-utilised leading to poor crop production, it can be lost to the atmosphere or leached from the soil causing potential environmental issues," he explains.

Professor David Powlson, emeritus scientist at Rothamsted Research and joint author of a recent review looking at the environmental implications of sulphur use, says there's much to be gained from applying sulphur separately from nitrogen.

"In recent years ammonium sulphate (AS), alone or with other nitrogen fertilisers, has accounted for the majority of sulphur applications made in the UK and has ►

A person with long hair, wearing a blue and purple jacket, is seen from the back, looking out over a vast field of tall grass. The scene is bathed in the warm, golden light of a sunset or sunrise, with the sun low on the horizon. The grass in the foreground is slightly out of focus, while the person's jacket is a prominent feature on the right side of the frame.

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According to Peter Scott, greater understanding of the types of sulphur and the role they play in crop production is essential if growers are to achieve the most from it.

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Emissions concerns

"However, AS fertiliser is subject to ammonia volatilisation in soils with a pH of 6.5 or above, which account for more than 60% of the UK's arable soils. This loss of nitrogen as ammonia, which is as great as with uninhibited urea on high pH soils, has received hardly any attention despite concerns regarding ammonia emissions and efforts to improve NUE," continues David.

The review found ammonia losses of up to 66% from AS on soils with a pH of 7.0 and above, with soils above pH 6.5 also at risk, he points out.

"Based on the fact 40% of UK arable soils are at or above pH 7.0, and 21% are between 6.5 and 7.0, this means replacing AS with a different source of sulphur could decrease ammonia emissions related to

sulphur fertiliser applications by 90%.

"This includes taking into account the likely emissions from the alternative nitrogen source required to replace the nitrogen in the AS," explains David.

He says AS is a cheap source of sulphur because it's a by-product from other industries. "We appear to have overlooked the fact that it has ammonia in it which can be lost and contribute to emissions. People tend to think all sulphur sources are the same, and they are not," he stresses.

Essex arable producer George Halsall of E. Halsall and sons Ltd, Langham, says sulphur has long been an important part of the farm's crop nutrition strategy, but a recent move to separate nitrogen from sulphur application is delivering notable benefits.

With a diverse rotation including potatoes, wheat, winter and spring barley, ►

Sulphur sources pros and cons

Ammonium sulphate (21% N; 60% S03)

Ammonium sulphate (AS) is long established as the main sulphur source in the UK and is widely available as a 'straight' and also within nitrogen sulphur (NS) compounds and nitrogen, phosphate, potassium and sulphur (NPKS) blends, explains Origin Fertilisers' Peter Scott.

"AS provides rapid dissolution giving immediate release with the nitrogen and sulphur working together, which can be beneficial. All ammonium sulphate contains N so sulphur can't be applied in isolation which reduces agronomic options and also increases CO2e of the product."

According to Peter, there's also a risk of ammonia volatilisation when applied to calcareous, high pH soils, as well as AS products not being suitable for organic farming.

"The rapid release of nutrients can result in leaching of both N and S in light soils and areas of high rainfall and, as AS contains ammonium-N, it is also highly acidifying to the soil.

"If you want to spread to 36m, you'll also have to make sure you choose the highest quality granules available," he advises.

Polysulphate (48% S03, 14% K2O, 17% CaO, 6% MgO)

UK-produced Polysulphate offers sustained release nutrients during a period of around 50 days to match crop requirements and deliver potential environmental benefits, continues Peter.

"This mode of operation reduces the risk of

sulphate leaching in light soils or in high rainfall considerably compared to AS, plus it means you can apply a full season's sulphur in a single, early application to reduce workloads.

"As Polysulphate doesn't contain N, it also means the best sulphur strategy can be planned separately from nitrogen, which gives greater agronomic flexibility."

Peter says Polysulphate is a multi-nutrient fertiliser which provides potash as well as calcium and magnesium in water-soluble forms which is important. "By providing water-soluble forms of four essential nutrients, Polysulphate offers growers good value for money."

Kieserite – magnesium sulphate (25% MgO, 50% S03)

Kieserite is another imported sulphur source for UK growers but is really only appropriate when magnesium is required, highlights Peter.

"While it's another natural mineral with a low carbon footprint like Polysulphate, it doesn't have the prolonged release, so rapid dissolution of its water soluble sulphate can cause leaching risks in light soils and areas of high rainfall

"The cost point per Kg of S is higher than with AS, so unless you're in a highly magnesium deficient situation, it's difficult to see its advantages for mainstream growers," suggests Peter.

Gypsum – calcium sulphate (32% CaO, 46% S03)

Peter believes although it's a source of sulphate, there are few specific advantages of Gypsum



UK-produced Polysulphate offers sustained release nutrients during a period of around 50 days.

over the other listed options. "It has low solubility so isn't really an ideal source of either calcium or sulphur.

"A lot is said about gypsum being used to alter the Ca:Mg ratio in the soil and improve soil structure, but there's little science available to support this theory," he says.

Elemental sulphur – 225-237.5% S03 (90-95% S)

Elemental sulphur is a highly concentrated source of S and the only product that contains S with no other nutrients, continues Peter.

"That said, sulphur in the elemental form isn't available for crop uptake as it must be oxidised into sulphate within the soil which takes time with no control over when the nutrient will be available to the crop.

"Soil bacteria can also react with elemental sulphur to produce sulphuric acid which can acidify soil," he concludes.

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Scott Garnett says increasing numbers of UK growers are now realising the benefits of decoupling nitrogen and sulphur applications.

► sugar beet and onions, plus a beef suckler herd to manage, flexibility of operations is a key element of the business' management approach.

"We're looking at ways we can build more sustainable production methods into our operations but always have an eye on the costs involved. No business is sustainable if it doesn't make money so there's definitely a balance to achieve.

"Reducing inputs and improving NUE are key drivers for us, but we're also looking at biosolutions to make our fungicide use more effective, for example, and growing cover crops to improve the soil."

George says the role of sulphur in the 'nitrogen equation' is well understood, as is its requirement for boosting grain protein, particularly in light of the farm introducing milling wheat.

"AS true granular compounds — both $27\text{N} + 30\text{SO}_3$ and $27\text{N} + 12\text{SO}_3$ — were used for many years but they were always a little restrictive. This is because whenever we wanted to apply sulphur, we were applying nitrogen and the ratios were fixed, so the plan was rigid.

"There were times when if we wanted to change the nitrogen rate, for example, we would also be changing the sulphur rate, leading to either applying too much of one or having to top up with an extra pass of N. When nitrogen fertiliser prices hit £1000/t, the cost of the nitrogen sulphur compounds increased too, so we decided it was time to take a look at the alternatives," he explains.

According to George, Polysulphate turned out to be a cost-effective option

which appealed because it could be applied separately from the nitrogen, allowing him to take a more field-by-field approach.

"It's simplified our nutrition management so we can now meet the different nutrient demands of the various crops we grow. The fact it's a prolonged release product also appeals as it means we can reduce workloads by putting on one application at the start of the season and the sulphur is then available as the crop grows during the next couple of months or so."

Polysulphate use

As a result, Polysulphate has been used for four years. "Our wheat, barley, sugar beet and silage crops all get 100kg/ha of Polysulphate at the start of the season to provide 48kg SO_3 /ha, with inhibited urea usually applied in 2-4 splits to complement this, ranging from a total of 240kgN/ha for our Crusoe wheat to 90kgN/ha for the spring barley.

"The fact it contains potash, magnesium and calcium are also benefits over other sulphur sources, and its ability to spread evenly at 24m has also impressed," says George.

ICL's Scott Garnett says increasing numbers of UK growers are now realising the benefits of decoupling nitrogen and sulphur applications, with Polysulphate gaining in popularity.

"It's a naturally occurring multi-nutrient fertiliser with an analysis of 48% SO_3 , 14% K_2O , 17% CaO and 6% MgO , so growers can select low emission sources of nitrogen to apply with it, rather than having N and S locked together.

"This allows for a flexible approach with a much-reduced environmental impact and



The sulphur provided by Polysulphate is in a readily available form unlike elemental sulphur which can't be taken up by plants.



Polysulphate's prolonged release ensures nutrient availability is matched to crop requirements through the growing cycle, says Scott Garnett.

significantly increased levels of efficiency. In fact, the NUE improvement from using Polysulphate leads to significant increases in yield and quality — this has been shown in numerous trials with yield uplifts of more than 8-12% in winter wheat and as much as 33% in oilseed rape, compared with the commonly used NS products."

Furthermore, Scott says in leguminous crops which rely on nitrogen fixed from the air, the addition of Polysulphate has been shown to increase yields by up to 40%. "Trials in vining peas, for example, have shown 75kg/ha of SO_3 applied as 150kg/ha of Polysulphate produces 1t/ha extra yield of peas."

Mined from under the North Sea in Yorkshire, Polysulphate's formulation and physical form has much to do with the benefits observed, he says. "University of Nottingham trials looking at soil leaching of nutrients have shown more than 50% of the sulphur contained in Polysulphate is released in the first 10 days after application, with the remainder available to plants during the following 6-8 weeks.

"This prolonged release ensures nutrient availability is matched to crop requirements through the growing cycle which is in contrast to traditional AS, where 100% of the sulphate is released within 5-6 days after application,"

According to Scott, the sulphur provided by Polysulphate is also in a readily available form unlike elemental sulphur which can't be taken up by plants. "Polysulphate, therefore, not only increases the efficiency of key nutrient uptake to maximise crop productivity, it also reduces the possibility of soil nutrient loss and resulting environmental consequences," he concludes. ■

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Tiros 2.0

Bioscience in brief

A new generation of biological seed treatment has been unveiled which promises to deliver performance over the product it supersedes. CPM finds out more.

By Rob Jones

With a steady pipeline of biological innovations from companies worldwide all vying for grower attention, competition in this market segment is stiff. But new product development doesn't always involve starting from scratch, that's the message from Unium Bioscience.

By building on the reputation of its existing seed treatment Tiros, Unium has developed a unique, advanced formulation of endophytes which supports and enhances rhizophagy and enables crops to fix atmospheric nitrogen.

And just like its predecessor, Tiros Max acts as a 'back up' power supply — fixing nitrogen from the atmosphere throughout the season, enhancing yield where standard rates are applied, or maintaining yield where nitrogen is required.

The new seed treatment also promotes the plant's ability to sequester phosphorus, potassium, zinc and additional microelements, but it does it all better, says Unium's director, John Haywood. "The enhanced formulation provides a prebiotic, also known as an extender, in powder form rather than a liquid.

"This delivers 13% more Colony Forming Units (CFUs) per seed by preserving the endophytes during application, as well as supporting and promoting early population growth during germination and establishment," he explains.

In the field, Tiros Max-treated seed has been shown to accelerate plant establishment and growth compared with untreated seed, with better root structure and biological interactions being observed. Additionally, trials show Tiros Max provides benefits equivalent to 30KgN/ha.

Essential endophytes

From a scientific perspective, work undertaken by Professor James White at Rutgers University in New Jersey, USA, shows that endophytes are essential for root hair development as well as their role in rhizophagy — where plants effectively 'farm' microbes to help them sequester nutrients from the soil.

James believes that microbes applied as biostimulant seed treatments can replace some of the microbes lost from seed during its journey from seed producer to farmer. As well as this, he says biologicals can also act as a supplement in soils where microbial communities are depleted.

"Biostimulant microbes placed on or near to the seed can kickstart the rhizophagy cycle. Some treatments contain endophytes which set up a more permanent association, provided the consortia selected are adapted to the crop plant, and the plant requires that community in its environment."

But this isn't the only way plants use microbes — some endophytes will be moved from the roots and spread throughout a plant's tissues. "Many plants will transfer these bacteria into their leaf hairs (trichomes) where they're fed plant sugars in exchange for the nitrogen these endophytes will fix from the atmosphere," explains James.

However, biological treatments have historically been variable in their effects when applied to seed. Therefore it's hoped the use of the extender in Tiros Max will bring new levels of consistency in performance, delivering the benefits James describes.

"The new formulation of Tiros Max sets

the bar even higher. It marks a real advancement in seed treatment technology by supporting the biology to a greater extent, demonstrated by the higher CFUs achieved per seed," comments John.

Whereas the dry formulation offers benefits over and above added performance in the field, it also offers flexibility at the time of seed treatment, he adds.

"Previously, the minimum quantity that could be treated was a batch of 10t. Through the new formulation, not only is a mixing phase cut out, it means it's now possible to treat small seed batches of five or one tonne, giving farmers much more flexibility when treating their own seed through a mobile unit," says John.

To celebrate the launch of Tiros Max, Unium is hosting an educational evening on endophytes in collaboration with BOFIN, featuring leading endophyte researchers from the United States. Farmer and agroecology consultant Ben Taylor-Davies (Regen Ben) will dig into the science and application of endophytes in agriculture in a 'fireside chat' style webinar with Professor James White and Washington University's Professor Sharon Doty, who discovered the strains of endophyte used in Tiros Max. ■

The event will take place at 6pm on 2 July. For further information see page 14.




The enhanced formulation provides a prebiotic, also known as an extender, in powder form rather than a liquid, says John Haywood.

Bioscience in brief

CPM would like to thank Unium Bioscience for kindly sponsoring this article and for providing privileged access to staff and materials used to help collate the feature.





“Data is
integral to making
good decisions”

Crop production insights

Whether it be on paper or more recently digitally, data collection has long been a key part of everyday farming. But how can growers use what they have at their fingertips to make better decisions? CPM finds out more.

By Charlotte Cunningham

There's an old adage in farming that says if you can't measure, you can't manage, and with the rise of precision technology and more efficient ways of capturing farm data, it seems the value of doing so has really come to fruition of late.

In an era where farmers are continually under pressure to get more from less, and extreme weather patterns throw even the most well-thought out plans into jeopardy, making decisions based on insight rather than guesswork is vital, explains Ed Downing, national crop nutrition manager at Frontier. “The challenge many growers face is assessing how successful they've been with their crop management and subsequent production.

“A lot of the time, people base results on gut feelings. The problem with this is it's harder to be sure how things like the

weather have impacted production, and there are much more accurate ways of assessing this.”

Ed adds that in just one season, while individual fields might have been exposed to the same weather, growers could find significant differences in performance. He says this isn't just likely to be in terms of yield and production, but also from a nutritional perspective as there can be a tangible variation in how crops have taken up and utilised nutrients.

“By measuring this and using data to make decisions there will naturally be learnings that can be taken into the following year, retested and monitored to see if changes have made an impact.”

Decision making

“Data is integral to making good decisions, and decisions and insight should be based on evidence. It's all about incremental gains — there's not likely to be ‘silver bullet’ gains for many growers, but actually it's all of the small things added together which tend to make the biggest differences.

“We're going to have to farm more efficiently and being able to identify exactly where and how to do that will be key.”

This is something Frontier has been aware of for some time, introducing the SOYL precision farming service more than 30 years ago. The SOYL platform works by using satellite imagery which shows crop biomass throughout the growing season, explains Simon Griffin, technical manager

at SOYL. “This shows variation across the field and we receive this information on a week-by-week basis.

“We're all about gathering insight from data — using data is going to become more and more important — both in terms of how we collect and how we interpret it and it's going to become more integral to farm management decisions.”

Gleaning the most accurate data comes via gathering it from a number of sources, he continues. “This includes soil type and soil nutrient, yield data and grain analysis. Integrating that with other technology such as satellite imagery to measure crop growth is going to be key to accelerating progress and ultimately supporting the industry to advance and make more



Making decisions based on insight rather than guesswork is vital, says Ed Downing.

evidence-based decisions.”

It's this grain analysis data source that Frontier and SOYL have been developing over recent years via its field grain analysis service which has recently been strengthened through the addition of a new nitrogen use efficiency metric. So what exactly is the field grain analysis service?

In a nutshell, it's based around analysing grain from individual fields, carried out by growers taking grain samples from trailers. The samples are then sent off for analysis and the results incorporated with other information, including yield and what nitrogen was applied.

This is different to the business' standard grain sampling service which signposts growers to the best target market for their harvested grain as a whole, based on its specifications.

Simon says the per-field approach gives growers greater insight into how efficiently fertiliser is being applied to their crops, as well as a deeper look at nutrient uptake and the efficacy of application rates. “Using samples of grain from individual fields, the analysis covers the full suite of key crop nutrients including nitrogen, sulphur, manganese, calcium, phosphorous, magnesium, zinc, iron, potassium, copper, boron and molybdenum.

“The benefits of having individual fields analysed not only allows you to receive guidance on nitrogen rates, you'll also find out your exact P and K removals from the grain so you can tweak any maintenance fertiliser applications. Additionally, you'll be able to understand if your crop was potentially deficient in any nutrients, both macro and micro.”

This data can be overlaid with historic biomass and weather data to highlight typical performance when certain biomass stages are reached, says Simon.

Questioning performance

Although the grain analysis service doesn't provide all of the answers, what it does do is focus attention on specific fields and allows growers and agronomists to ask why they've performed differently to others, continues Ed. “It also gives pointers as to what you should be reviewing, for example, nitrogen rates and timings or perhaps it might be soil structure issues.”

The new nitrogen use efficiency module adds to the existing service by producing a report which compares how much nitrogen was in the harvested grain with how much was applied to the crop to determine the overall efficiency levels, with colour-coding indicating the efficiency of the strategy, explains Simon. “An NUE



Gleaning the most accurate data comes via gathering it from a number of sources, says Simon Griffin.

score of less than 60% would indicate improvements could be made and that the current nitrogen strategy wasn't the optimum for that field.”

Ed continues: “We know that nitrogen isn't always the limiting factor to yield, so increasing rates when this is the case is obviously likely to result in more cost but without the results.

“But in some situations, it is, so in these ►

View from the field

Among the farmers who have benefited from the field grain analysis service is Hampshire arable farmer, Julian Gibbons.

Farming in partnership with his brother Andrew, Julian is cropping 567ha, with a typical rotation including two break crops, winter wheat, winter barley and spring barley.

“We've used YEN Nutrition for quite a few years. For me, looking closer at nutrition and the results which come from that is a really good way of sense checking what you've done and highlighting if perhaps you ought to tweak things,” he says.

“Especially when fertiliser prices went sky high, it emphasised the importance of looking closely at what you're doing and if your strategy is effective or not.”

To strengthen this, Julian has more recently been trialling the new NUE metric within the SOYL system. “We're already doing variable P,K and N through SOYL — and have been for the past 15-20 years — so this seemed a natural extension and expands what we're doing via YEN.”

In terms of usability, Julian says the service

is straightforward and requires minimal effort from his side of things. “We generally take samples from fields anyway as we harvest them, so it's just been a case of adding another sample bag to the collection; the lab only needs about 100g.”

Looking at the results he's gleaned from the analysis, a few surprising deficiencies have been highlighted, notes Julian. “Interestingly, we're low on sulphur even though we apply bags of it. That makes one consider if there's something else to factor in, for example, is this due to application timing and the intense rainfall we've been having?

“Usually, we're putting it on with the first application, so are we losing too much of that now due to the weather?”

Julian adds that this has led him to look into the value of other sources of sulphur, such as polysulphate, as a better alternative which is released slower through the spring. “Or, there's the possibility of just applying little and often instead.”

As well as this, Julian says he's found the field grain analysis to be a really useful way of



Using the new NUE metric in SOYL has shown that Julian Gibbons' farm is low in sulphur, despite applying 'bags of it'.

trialling other technologies such as biostimulants. “We did this last year where we looked at different seed treatments — including biostimulants — and used the grain analysis data to really drill down to identify if and where we were seeing any benefits.

“Put simply, the technology allows you to look at what you've done and see if it's worked or not — something which will no doubt be hugely important to growers going forward.”



The new nitrogen use efficiency module adds to the existing service by producing a report which compares how much nitrogen was in the harvested grain with how much was applied to the crop to determine the overall efficiency levels.

► scenarios increasing nitrogen rates will have an impact. By arming growers with the tools and technology that takes into account historic and current biomass and yield and then overlaying grain analysis from individual fields, we can really start to identify these opportunities with confidence. Being confident with what you're doing along with future retesting is vital."

When it comes to application programmes, growers can use the information to best determine whether more inputs are warranted in certain areas of the crop and, using variable rate technology, can go on to auto-adjust application rates to different parts of the field, adds Simon.

"In the trials that we've conducted —

split tramline comparing variable rate with flat rate applications — we've found the best way of improving NUE is matching nitrogen inputs to crop yield potential. That's where we've continually achieved the greatest results."

New innovations

Having such an accurate way of measuring the impact of inputs could also give growers confidence to trial new technologies too, believes Ed. "We're seeing products like endophytic bacteria come to the market that are designed to colonise the plant and fix atmospheric nitrogen and deliver it to the crop. Obviously including this kind of innovation within the programme means growers gain an extra source of nitrogen and it's going to take time to understand how exactly these technologies will work on a commercial farm setting and how we can adjust all nitrogen sources as a result."

Using tools such as the new field analysis service from SOYL could help farmers do just that, he continues. "For example, growers could use it to look at how to manipulate nitrogen doses on top of new technologies and if/how that delivers into yield and grain.

"The more you're able to measure success, the more confident you can be with bringing technology into the programme."

Ed adds that Frontier is currently testing a product called Blotta Max which is designed to make phosphate more available to the crop. "We've had some success in terms of replicated trials and improved crop performance and yield," he says.

Crop production insights

CPM would like to thank Frontier for kindly sponsoring this article and for providing privileged access to staff and materials used to help put the article together.



"When conducting grain analysis something we've continually picked up is low levels of phosphate in grain — even when soil levels are deemed to be sufficient. We're still learning in terms of the level of confidence we place on these results because it's still early days compared with soil analysis. But in situations like this, bringing in a product like Blotta Max when you have evidence there's an issue with phosphate uptake, could make all the difference to overall crop performance."

Ed concludes that the service is a great starting point for growers at a challenging time for the industry. "The way we farm has and is going to continue to rapidly change. Precision feels like the direction of travel across the whole supply chain and while there may be apprehension that monitoring and measuring causes more work and cost for growers, it's actually a sure-fire way to ensure that efficiencies are being maximised which in the long run will only be a positive thing for both growers' time and the bottom line." ■

Nitrogen Use Efficiency (NUE) Report																	
Client:		Demonstration Farm															
Farm Name:		Demonstration Farm															
Address:		Farm Drive															
		Farmington															
		Farmshire															
		FA12 18M															
Report Date:		29/05/2024															
Field Name	Market	Grain Yield t/ha	N Applied	N offtake	Wheat: Grain protein			NUE - Nitrogen Inputs / Output Balance			Kg yield per Kg N		Surplus N Kg		N yield offtake compared to National av.		SCORE
					%	Interpretation	Score	%	Interpretation	Score	kg	Score	kg	Score	t/ha	Score	
Field 1	WW - Feed	9.65	190	177	12.31	Very high	2	93%	Close to mining	4	51	4	13	4	1.7	4	18
Field 2	WW - Feed	10.97	175	153	9.35	Low	3	87%	Great	5	63	5	22	4	3.0	4	21
Field 3	WW - Milling 13%	9.91	280	195	13.17	Optimum	5	69%	Average	3	35	2	85	2	1.9	4	16
Field 4	WW - Milling 13%	10.12	240	179	11.86	Very low	1	75%	Good	4	42	3	61	3	2.1	4	15
Field 5	WB - Feed	6.46	165	88	1.60	Low	3	53%	Ok	2	39	2	77	3	-0.5	2	12
Field 6	WB - Feed	8.96	175	149	1.95	Optimum	5	85%	Great	5	51	4	26	4	2.0	4	22

An NUE score of less than 60% would indicate improvements could be made and that the current nitrogen strategy wasn't the optimum for that field.

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“Varieties that can stand on their own two feet, thanks to their good agronomics, are the ones which will be favoured on farm.”

Fit for the Future

As growers seek to cultivate sustainable rotations for the future, wheat is likely to be a mainstay of many cropping plans. But how can growers get the most bang for their buck? CPM speaks to the experts.

By Charlotte Cunningham

While wheat is the backbone of most arable businesses, how exactly it's incorporated into the rotation has endless options.

From high spec Group 1 milling types to barn-filling Group 4s, they all have their pros and cons. But selecting the best option for the individual farm based on soil type, historic performance and market opportunities, is fundamental when it comes to growing a profitable wheat crop, explains James Webster, senior agribusiness analyst at The Andersons Centre. “Wheat consistently has one of the highest gross margins across all crops which is why it's the most largely grown crop, and fundamental to that is the high demand in the UK — particularly for milling varieties.”

As such, varieties which have high yield potential and keep input costs low are key

Sowing profitability

to getting the most out of what can be a very profitable crop, says James. “This is as well as having good access to markets and adapting the cropping strategy based on market demands where possible.

“For example, thinking about this year's harvest, we know a lot of farmers will have had issues with establishment and therefore profitability is likely to be significantly down — winter wheat plantings for this year's harvest are estimated to be down by about 310,000ha. So looking beyond 2024, there's likely to be an even greater focus on variety choice and minimising the risk that comes with growing crops as much as possible.”

Milling wheat premiums

Looking more closely at market demand, James points out there have been strong premiums for milling wheat during the past few years due to some of the cropping challenges growers have faced, which is something to also factor in when making future decisions. “Coming out of Harvest 2023 we had poorer quality wheat, and coming into Harvest 2024 there are understandably concerns about availability — and also getting nitrogen onto crops — which will again most likely lead to a strong milling premium this year.”

Taking this into account, James says when it comes to selecting a wheat variety, having versatility to grow something which could access milling markets may prove to be beneficial. “Obviously there's a risk associated with growing for higher spec, so if you're not so comfortable with growing milling wheats, high yielding

wheats with less risk is another way of maximising returns. This could come via growing a variety with a strong untreated yield characteristic, for example. It's all about just opening options up as we look ahead.”

James notes that high yielding Group 4s are likely to be one of the most consistently profitable options as they're less exposed to volatility of input prices or commodity fluctuations, but to make the most of this, growers should select something with strong all-round performance.

There are also ample opportunities in growing Group 2s too, adds James. “Group 2s are seen as the second tier of the milling wheat market — there are some good yielders in there and the opportunity



Having good access to markets, a consistent yielding crop and minimising unnecessary input costs are key factors in ensuring wheat profitability, says James Webster.



With extreme weather events having a greater impact on growers in recent years, new varieties need to be robust and consistent, says Mark Dodds.

to look at multiple markets. But we're also seeing some really good contracts for Group 2s now in terms of milling premiums with millers who recognise and understand the performance of Group 2s and their potential."

Among the Group 2 options that could offer growers flexibility is KWS Extase which boasts a combination of high yields and good agronomics which, when treated with the best chemistry, can help deliver excellent gross margin opportunities on-farm, explains the firm's Kirsty Richards. "When Extase was launched, it set a new benchmark for Group 2 wheat in the UK with its versatility, and breaking the mould delivering the very best combination of high untreated yields with excellent grain quality gaining it a huge following. Its continually proven track record since then has earned it a place amongst the UK's most successful milling wheats ever," she believes. "Even now, it's still an exciting variety, trumping all others for profitability when grown in the right conditions."

Looking closer at its characteristics, with a specific weight of 79.4 kg/hl and a Hagberg Falling Number (HFN) of 294, Extase has among the highest scores of any recommended breadmaking wheat, points out Kirsty. "Plus, Extase is a well-established Group 2 variety which is supported by a buy-back contract for full milling specification through to lower protein flours by many national millers."

However, the beauty with Extase is that selecting it offers growers flexibility — serving as a good feed wheat option too if milling specification is unachievable or local milling opportunities simply don't exist.

This is something John Pape, seeds manager for Quantils Seed Services, believes is a particular strength of the variety for his customers. "We're based in Lancashire and the local milling opportunities are limited, meaning most farmers in the region are targeting feed markets. That said, since it hit the list, Extase has continually been one of our top three varieties — despite its classification as a Group 2."

Easy management

The key thing growers seem to like about Extase is its cleanliness and ease of management, notes John. "We're not in a hugely arable region here in the North West — cereals tend to be predominantly grown as a break crop to grass and vegetables which are the main cash crops.

"What that means, in practical terms, is a lot of growers don't want high input varieties — they don't want something that they're forever going to have to keep an eye on and applying a lot of costly chemistry or inputs to. What they tend to like is tried and trusted varieties and this is essentially what has kept Extase at the top of the list."

John adds that Extase's septoria resistance score — 7.4 — is something that makes it a particularly attractive variety. "Where we are, septoria is a key disease for a lot of growers, again making Extase an obvious choice. But it's also pretty solid on its other agronomics which makes it stand out as a lower input type."

It's also become evident that it's suitable for later drilling, adds John. "While I wouldn't say we're in a necessarily late drilling region, if farmers haven't been able



John Pape says Group 2 Extase is a variety he can confidently put on farm and know it's going to perform well.



When Extase was launched, it set a new benchmark for Group 2 wheat in the UK, believes Kirsty Richards.

to get other crops off until later, Extase offers that extra flexibility and confidence that you can plant it late but it'll still get going quickly and perform well. With the weather the way it is lately, having that second bite at the cherry with something like Extase is really beneficial.

"As a merchant, Extase is a variety I can confidently put on farm and know it's going to perform well."

Thinking about what growers — and merchants alike — are going to require when it comes to wheats of the future, John says while yield will always be king, there's now more focus on selecting a good all-rounder which minimises risk as much as possible throughout the growing cycle.

"Although everyone wants to achieve the highest yield they can, there's definitely more of a consideration from our growers about factors like cleanliness. As we go forward, it's clear there'll be more key actives leaving the chemical market, so varieties that can stand on their own two feet thanks to their good agronomics are going to be the ones which are favoured on farm.

"Certainly when I'm looking at new varieties, if it has one major flaw in its disease resistance profile then I switch off as I know it's not what our growers are looking for out of their future wheats."

Breeding wheats tailored to the future demands of farming is something KWS has been focused on for quite some time, says the firm's Mark Dodds. "When we think about the next generation winter wheats, they're being developed and created for an environment where growers have reduced chemistry at their disposal, ▶

Fit for the Future

► hugely varied growing seasons due to the impact of climate change, and huge external pressure on crop inputs, protecting soil health and adhering to political and market volatility”.

KWS has a number of new candidate varieties going through testing at the moment, these include:

Potential Group 1

- KWS Vibe (KWS W443)
- KWS Beste (KW 2226-19)

Potential Group 2

- KWS Arnie (KWS W441)
- KWS Newbie (KWS W442)
- KWS Equipe (KM 21110)

Potential Group 3

- KWS Solitaire (KWS W440)
- KWS Flute (KWS W447)

Potential Group 4 soft

- KWS Vicarage (KWS W436)

Potential Group 4 hard

- KWS Scope (KWS W432)
- KWS Mongoose (KWS W450)

Looking closer at some of the detail, based on its pre-market trials, KWS Vibe looks set to be a robust new offering for Group 1 growers, says Mark. “From KWS milling trials over a number of contrasting seasons, KWS Vibe has higher protein than the today’s Group 1 controls with gluten quality and loaf volume being good. More importantly on-farm, potential milling wheats of the future have to routinely produce 13% protein to serve the end market and, in our trials, KWS Vibe regularly delivered high proteins with good grain characteristics — giving it excellent promise for the future.”

KWS has also carried out a large-scale lab evaluation comparing KWS Vibe with KWS Zyatt, using samples taken from KWS co-located plots and grown to milling protocol. Mark Charlton, head of cereals milling and baking services at Allied



KWS has 10 new candidate varieties up for recommendation this harvest.

Technical Centre said in baking, Vibe performed very well in all products and was of better quality than the KWS control. He also echoed the views from the NL trials, stating the variety has good gluten strength, and said it has good potential across a wide range of recipe types used in the UK.

Appealing traits

Looking at the wider characteristics of the variety, figures to date suggest a very high untreated yield, supported by excellent scores for mildew, yellow rust, eyespot, septoria and brown rust.

Turning focus to other potential new options, KWS Arnie is a new potential UKFM Group 2, offering UK yields 3% above those of KWS Extase. “It’s a medium strawed, but very stiff, variety backed by an excellent set of disease scores including a 7.1 for septoria and 8 for eyespot,” says Kirsty.

Fans of KWS Extase will also probably find themselves drawn to new KWS Equipe, too, she adds. “It’s another French-bred variety with a high yield, performing especially well in the west thanks to its excellent disease package including a 7.1 for septoria.

“Finally for those in the north, KWS Newbie is potential Group 2 wheat with superb grain characteristics and impressive all round potential.”

Growers looking for a new Group 4 alternative for the future will likely be attracted to KWS Mongoose, adds Kirsty. “It’s a super short, very stiff type that is very early to mature, offering growers real harvest security even when the weather is subject to change. Like KWS Dawsum, Mongoose can be sown early in September through to the end of January and delivers yields of 106% of controls seen in trial putting it ahead of many hard feed favourites.”

Kirsty concludes: “When we think about the types of varieties that are going to take arable growers into the future, it’s ones like KWS Vibe with good agronomics that can achieve a premium which are going to help that all important bottom line across the supply chain.

“With 10 candidates up for recommendation this harvest it looks to be an exciting year for us as breeders, but also for farmers who’ll hopefully benefit from a host of new options right across the growing groups, allowing them to make better choices as they plan for a sustainable future.” ■



KWS Vibe looks set to be a robust new offering for Group 1 growers.

Fit for the Future

In this series of articles, *CPM* has teamed up for the seventh year with KWS to explore how the cereals market may evolve, and profile growers set to deliver ongoing profitability. The aim is to focus on the unique factors affecting variety performance, to optimise this and maximise return on investment.

It highlights the value plant genetics can now play in variety selection as many factors are heavily influenced and even fixed by variety choice.

KWS is a leading breeder of cereals, oilseeds, sugar beet and maize. As a family-owned business, it’s truly independent and entirely focussed on promoting success through the continual improvement of varieties with higher yields, strong disease and pest resistance, and excellent grain quality. KWS is as committed to your future just as much as you are.



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AHDB

RECOMMENDED

“Beowulf is a variety that's been bred by design to include all the key attributes wanted by growers and agronomists.”

Insider's View: wheat

An epic reimagining

Beowulf has arrived as the strongest fighter, ready to take on Grendel and his mother, but this time in the form of the highest yielding hard feed wheat armed with an arsenal of strong agronomic characteristics. CPM investigates.

By Melanie Jenkins

Beowulf might be known as the legendary protagonist of the epic poem, but a new hard feed wheat variety could be about to reimagine the tale from an entirely new angle.

Although Limagrain is less well-known for its hard Group 4 feed wheats, with the elevation of LG Beowulf to the top of AHDB's Recommended List, the firm is trying to change this. “We're building our profile in this Group, first with the launch of LG Typhoon, now with Beowulf and hopefully LG Rebellion as a candidate variety,” says Limagrain's Ron Granger.

Achieving an average UK yield of 106%, Beowulf is consistent across the different

regions, he explains. “Often there's an expectation of a dip in yield in the West and North, but this variety yields consistently everywhere. It also demonstrates a wide sowing window of performance, averaging 105% in early sown trials, 106% in the main window and 108% when later sown.”

Consistency in performance is what Limagrain's wheat breeder, Phil Tailby, believes to be the standout feature of Beowulf. “We've seen it perform just as well as a second wheat as it has as a first, whichever window it's been sown in, across light and heavy soils as well as in all regions — it just gets the job done.”

Respected lineage

Although the author of the epic poem Beowulf is up for debate, the parents of Limagrain's wheat iteration are of well-known pedigree and it's this that's captured the attention of the seed trade. “Beowulf is a cross of Gleam and Costello, which are two varieties that are well thought of on farm,” explains Frontier's Jim Knightbraid. “Costello provides excellent grain quality which growers will like, while Gleam is notable for its consistency — it's performed on all systems, across drilling windows, regions and seasons. And considering we've seen such a diversity

in conditions during the past four years, from flooding to drought and delayed harvest, having a variety with these two parents instantly makes it stand out.”

Beowulf is the first cross of these two varieties to make it to the RL and its parentage is the first aspect of the variety



Limagrain might be less well-known for its hard Group 4 feed wheats, but with the elevation of LG Beowulf to the top of AHDB's Recommended List, the firm is trying to change this.

that stood out to Stuart Rowley of independent seed and grain merchants, Mortimers. "We still have Costello being grown

locally after all this time, which speaks volumes for Beowulf's parentage."

Ron believes Beowulf is an ►

Standing out

Alastair Brumfield is growing his first seed crop of Beowulf for Mortimers grain and seed merchants. Operating a 170ha family farm near Beverley in East Yorkshire on the edge of the Yorkshire Wolds, he grows wheat, barley, beans, peas and usually oilseed rape.

Around 50% of his wheat area consists of seed crops for Mortimers, with the farm having a long-standing history with the firm going back to at least the 1980s. "Mortimers offered me Beowulf for the 2023/24 season, providing 2t for me to sow. The first crop was drilled after oilseed rape on 18 September at 180 seeds/m², which is a little lower than we'd usually aim for."

The ground was min-tilled, drilled with a Claydon strip-till drill, rolled and sprayed with a pre-emergence herbicide within a day. "We then had 5cm of rain and when the Beowulf came through it didn't look very good."

Going into October Alastair slug pelleted the crop four times, anticipating challenges with growing the crop. "However, the crop improved through winter, tillered really well and I now wish all my wheat looked like the Beowulf as it looks magnificent."

An aphicide was applied in

November once Alastair could travel on the ground to help keep BYDV out of the crop until March. Since then, he's applied a PGR and Iodus (laminarin) at T0 to help support the crop's septoria resistance, followed by Inatreq (fenpicoxamid) and Rlyox (mefentrifluconazole+pyraclostrobin) in conjunction with Cleancrop Alatrino Evo (trinexapac-ethyl) at T1. "There weren't any real signs of disease in the crop other than a little septoria early on, which is why I applied the Iodus."

The crop had an application of urea at 45kgN/ha in late February, which was followed by the equivalent of 90kgN/ha from pig slurry the first week of April, and finally a further 50kgN/ha from liquid fertiliser the second week of May. "The pig slurry was due to be applied earlier but it was just too wet, so I applied Polysulphate to ensure the crop had enough sulphur as none was applied with the first dose of N."

Although Beowulf is still to be harvested, Alastair will be growing the variety for Mortimers and likely for good parentage with a decent chance of a strong specific weight, so if it yields well, I'll be planting it as a feed crop as well as for seed."



The crop of Beowulf being grown as a seed crop for Mortimers near Beverley in East Yorkshire improved through winter and tillered well.

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According to Phil Tailby, last year was a particularly high lodging year but Beowulf was one of the stiffest varieties in both Limagrain and official trials.

► upgraded version of Gleam. "When two varieties are crossed, breeders are aiming for the best characteristics of both parents while losing the worst ones. Beowulf is a variety that's been bred by design, to include all the key attributes wanted by growers and agronomists such as high yield performance and consistency in variable climates. Previously, varieties weren't able to cope with such variable climatic conditions, so breeders have focused on producing material which is able to perform across different situations."


Yield retention

Jim believes Beowulf to have good grain characteristics with a specific weight of 78.3kg/hl and a Hagberg of 253. "It's at the top end of the feed wheats for quality, and unlike some of the other more recent




Interest in Beowulf has already been strong – Jim Knightbraid is confident there's enough seed crops in the ground to supply 7-8% of the UK's certified area.

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additions to Group 4, Beowulf does retain yield without compromising specific weight."

The variety's grain quality has also been noted by Stuart, who looks for strong traits in varieties to help growers achieve grain premiums. "Varieties that don't hit the right specific weight won't make their way through our selection process," he stresses.

Having good grain quality has been recognised as an important attribute to have when it comes to particularly wet or dry seasons, explains Ron. "The big, bold grain can add weight to a crop which is especially important with the changeable seasons we've been experiencing."

Furthermore, he flags that Beowulf has strong resistance to yellow rust and a good score against septoria with a 6.7. "It's important for varieties to score at least 6 for this disease as that's what both growers and agronomists have advised as the minimum accepted rating in recent years," comments Ron.

Because Brown rust is more of an issue for southerly growers, Jim advises supporting Beowulf's resistance score of 5 with a correctly timed fungicide. "Beowulf has a strong disease resistance profile but it's not a low input variety, so it's important to support its high output with the appropriate fungicide spend."

Jim also notes Beowulf's untreated yield performance in Frontier's trials where there was recognisable disease pressure and no PGR applied. "It has the third highest untreated yield on the RL, and the fifth highest in our trials which is reassuring."

Another string to Beowulf's bow is its orange wheat blossom midge resistance,

he adds. "It's good that Beowulf has this, and although most feed wheat varieties do, more than 50% of the planted crop area doesn't have OWBM resistance. So Beowulf provides an opportunity for growers to bring the resistance back into their rotations."

OWBM resistance is an aspect Stuart believes is important, especially for Mortimers' growers who are largely located around the Yorkshire Wolds. "In many cases, OWBM is a critical requirement for a variety and growers won't even entertain one without it, but this trait has to be combined with grain quality."

Standing ability

Beowulf scores strongly for its standing ability but Jim says up until Harvest 2023, it hadn't had a testing season. "However, we saw this tested more last year which has given us confidence that it has bankable straw strength, with very low instances of lodging in trials — something which is particularly important north of the Humber."

According to Phil, last year was a

particularly high lodging year but Beowulf was one of the stiffest varieties in both Limagrain and official trials. "It's no good for a variety to have a big yield and then not have stiff straw, so we've ticked both boxes with Beowulf."

Because Beowulf is towards the later end in terms of its maturity, Jim advises balancing it with earlier varieties in the rotation. "A +2 for maturity isn't of concern and there are plenty of varieties with earlier maturity which can also be planted alongside it on farm to balance."

All in all, Beowulf's strong disease resistance profile alongside its yield potential and grain attributes, have been achieved through advances in plant breeding, says Phil. "We have tools in our programme to be able to follow and map ▶



Orange wheat blossom midge resistance is an aspect Stuart Rowley believes is important, especially for Mortimers' growers who are largely located around the Yorkshire Wolds.

LG Beowulf at a glance

Yield (% treated controls)	
UK treated	106.2
UK untreated	90.9
East region treated	106.4
West region treated	105.5
North region treated	[107]
Grain quality	
Specific weight (kg/hl)	78.3
Protein content	11.1
Hagberg Falling Number	253
Agronomics	
Resistance to lodging without PGR	8.1
Resistant to lodging with PGR	7.5
Straw length without PGR (cm)	89.9
Ripening (days +/- Skyfall)	+2
Disease resistance	
Mildew	[6]
Yellow rust	8.9
Yellow rust (young plant)	-
Brown rust	4.7
Septoria	6.7
Eyespot	5.6
Fusarium ear blight	[6]
Orange wheat blossom midge	R

Source: AHDB Recommended List, winter wheat 2024/54 – [] = limited data.

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Ron Granger says Beowulf is an upgraded version of Gleam, bringing in the best characteristics while losing the worst ones.

► lots of disease resistance genes, so it wasn't a surprise when we started to see populations from the cross of Gleam and Costello perform so well in the field. We've

been able to breed in multiple resistances through marker assisted selection, and this also allowed us to pull out lines with better specific weight and yield much earlier than we'd previously have been able to.

"We're making a lot fewer crosses than we were 20 years ago, and can be more nuanced and targeted with what we're doing. More work goes into each cross as we have the ability to pull apart populations and find lines that are superior, with a greater combination of desirable genes including the specifics of Hagberg and sprouting," he explains. "We can be really precise which means there are exciting things coming through the pipeline due to vast improvements in the whole breeding programme over the past few years.

Resilience strategy

"This'll allow us to produce varieties better able to cope with the pressures from changeable weather, or challenges posed by difficult farm conditions — it's all part of a resilience strategy that made it possible to produce Beowulf. We're now putting a concerted effort into producing the next Group 1," he adds.

Interest in Beowulf has already been

strong, with Jim confident there's enough seed crops in the ground to supply 7-8% of the UK's certified area. "The only caveat is the condition of the UK seed crops due to the difficult winter we've had, especially if some hasn't been drilled."

However, Frontier's seed growers have reported that the variety has come out of the winter well. "Some of it was drilled late but everyone is pretty happy with how it's looking. Beowulf will have nationwide appeal and it's one of the best, if not the best, variety in terms of yield potential for Harvest 2025."

Ron reaffirms that there should be plenty of Beowulf seed available for planting this autumn. "There's been a good amount of interest in the variety already but there are enough seed crops in the ground to meet demand."

Stuart is keeping an eye on how Beowulf performs for Mortimers' seed growers, with the hope that it'll demonstrate a bold grain, hold onto its Hagberg and won't sprout to help growers make a premium. "We're looking to see how it performs on the Wolds, in both treated and untreated situations. If Beowulf has a strong start, there's hope that it'll have longevity in the market." ■

The advertisement features a collage of four images of agricultural machinery: a green steam tractor, a green steam roller, a black tractor, and a red and blue truck. In the center is a large yellow circle with a red border containing the text: **DON'T MISS OUT!**
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Something different

Varieties

As breeders continue to capture attention with ‘big’ varietal launches, a range of alternative options are coming to the table which promise to offer growers broader choice and something different. CPM takes a look.

By Janine Adamson

From low-input approaches and regenerative farming to a changing climate and high stress conditions, varietal choice is becoming more nuanced by the season. And while key players continue to launch flagship varieties, new genetic material is beginning to feed through from alternative sources too.

Delivering greater diversity in plant genetics is something which Cope Seeds’ managing director Gemma Clarke is striving to address. Set up in 2003 by

Trevor Cope, the business originally aimed to serve organic growers, but as farming shifts away from high input regimes, Gemma believes there’s now a wider market for what Cope Seeds has to offer.

Wider appeal

“We’ve always been perceived as catering for certified organic growers or those seeking niche crops such as naked oats, spelt or rye. But we’ve found the new material we’re introducing from both UK and European breeders has relevance to conventional growers too, particularly those opting for a low-input or regenerative approach,” she says.

According to Gemma, although there are three strands to the family-owned business – genetics, seed and grain — it’s the genetics element of Cope Seeds which can be overlooked, despite 25% of earnings being invested in research, development and trials to ensure continuous progress.

But through building relationships with plant breeders Europe-wide, Cope Seeds is now seeing the fruits of its labour, with the launch of three new varieties. Gemma hopes that by offering stand-out traits, growers will back these curve ball options.

Closest to realisation is Everlong — a Group 4 spring wheat which is now on the AHDB’s Recommended List. “Everlong offers the highest treated yield (107%) and specific weight (80.4kg/hl) of any spring wheat on the RL yet also provides growers ►

“ We’ve found the new material we’re introducing has relevance to conventional growers too. ”



Gemma Clarke says the new genetic material Cope Seeds is introducing to the UK has appeal to both organic and conventional growers alike.



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Limagrain

► the market including varietal blends, but our pipeline applies to all regimes. And because we're committed to continual investment, we have a strong longer-term pipeline too,

including winter wheats," adds Gemma.

"The challenge is improving awareness of the business and maintaining momentum so that we can start to stand out as

Hyvido Neo



Hyvido varieties have delivered higher yields than their conventional feed barley counterparts for the past five years, says Mark Shaw.

By bringing a pipeline of innovative new traits through to market, Syngenta is promising to extend its existing portfolio of hybrid barley varieties to offer growers future-proofed solutions.

First introduced 21 years ago, Hyvido has become the recognised sub-brand behind varieties such as SY Kingsbarn, SY Nephin, SY Thunderbolt and more recently, SY Buzzard. But now it's time for phase two through the launch of Hyvido Neo.

According to portfolio manager for hybrid barley, Mark Shaw, the Hyvido range has come a long way since it was originally launched. "Hyvido began with a focus on high and stable yields but we've now learnt it delivers much more. Among the benefits of this hybrid vigour include excellent agronomics, grass weed suppression, heterosis underground, market flexibility and next generation traits.

"But undoubtedly yield is still important — in AHDB Recommended List trials, Hyvido varieties have

delivered higher yields than their conventional feed barley counterparts for the past five years," he comments.

Furthermore, as growers look to improve resource efficiency in the face of ever challenging growing conditions, hybrid barley has been shown to do 'more from less', explains Mark. "Trials undertaken by ADAS show that Kingsbarn and Thunderbolt offer significantly higher NUE than conventional varieties and we believe this characteristic will only grow in importance," he adds.

To build on this further, Syngenta is extending its Hyvido portfolio to launch a range of new traits in the guise of Hyvido Neo. Hybrid barley technical expert, Ben Urquhart, says Hyvido Neo is being split into short-, medium- and long-term breeding targets.

"Short-term we're focusing on plant viruses such as barley yellow dwarf virus (BYDV) and the lesser known wheat dwarf virus (WDV) in order to deliver broad-spectrum virus resistance. Then medium-term we plan to investigate seed-borne diseases such as smuts and bunts.

"Finally long-term, we're aiming to look to the future to address wider climate change-related challenges including water limitation, drought and heat stress, and salinity," he explains.

Ben has high hopes for the first Hyvido Neo launch — RL candidate variety, SY Kestrel, which offers the promised broad-spectrum virus resistance. "Kestrel has resistance against three of the BYDV isolates (-MAV, -PAV and -RPV), whereas previously in varieties such as Buzzard, it was only tolerance. In addition to this, although it's not such a problem for UK growers at the moment, Kestrel is the first UK variety to have WDV tolerance too.

"This is importance because we

having material worth backing.”

Having achieved success with RL-listed spring oat Merlin, which Gemma says should be number one across all of the UK next year, it could be

argued that Cope Seeds has already proven that success is possible. “We just require that same success with a conventional cereal variety,” she points out. ►



Ben Urquhart says SY Kestrel offers significant benefits from its viral protection and is the next step up from SY Buzzard.

perceive WDV as an incoming threat due to its increasing prevalence in Europe,” suggests Ben.

With Kestrel offering so much in terms of virus resistance, Syngenta is using the variety as an opportunity to further understand aphid behaviour and how BYDV interacts with Kestrel’s genetics, working alongside the University of Nottingham.

“This will provide an indication of the variety’s performance and the longevity of its traits. Initial findings suggest fewer aphids settle on Kestrel compared with the NIL variety — which is essentially Kestrel without the virus resistance.

“For growers, there are the wider benefits associated with no insecticide use — lower input spend and the opportunity to apply for SFI payments. It also removes any risk to beneficial insect populations that you might want to foster.

“Finally, having protection in-built from day one reduces spray window burden to create more flexibility,” he explains.

Agronomically, he believes Kestrel offers a lot. “It has a strong package — scoring 7s for rhynchosporium and

mildew resistance, with early maturity and a low lodging risk. But it also delivers on output achieving a UK treated yield score of 103%.

“I’m genuinely excited by this variety — it offers significant benefits from its viral protection and is the next step up from Buzzard which was already a solid starting point,” concludes Ben.



Kestrel has resistance against three of the BYDV isolates (-MAV, -PAV and -RPV) and is the first UK variety to have WDV tolerance.



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Currently on the candidate list, Inys is the first 6 row hybrid from KWS. Inys was the highest yielding barley in both it's NL1 and NL2 trialling years. Its yield is very strong in the West ([114%]), with high yields in the East (109%) and North ([106%]) too.

Coupled with a high untreated of [93%], Inys is a step up in yield from all current hybrid barley varieties. It has a good all round disease profile and is early to mature, making it an ideal entry for oilseed rape. It has shown no lodging on the 2 year NL report 2023 and low levels of brackling (7%) compared to other hybrids.

*INYS is a RL candidate variety - all data taken from Winter barley NL 2-year report 2022-2023.

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Everlong is a Group 4 spring wheat which is now on the AHDB's Recommended List and boasts the highest treated yield (107%).

► with a complete package," says Gemma.

"Among its benefits include a wide drilling window which makes it a strong contender whether that's as a true spring wheat or as a late-drilled autumn planting. We know it performs well in low-input scenarios and can be used within organic regimes."

According to the AHDB's variety comments, during three years of testing, Everlong has shown no major weaknesses in disease resistance and has high resistance to yellow rust, brown rust and mildew (based on limited data), as well as being relatively early to mature.

And while the variety has been positioned as a Group 4 feed wheat, in Austria where the genetics were developed, Everlong is being grown for milling, comments Gemma.

Perhaps most attractive to conventional growers with its broad appeal will be German-bred Aretha — a winter barley which Gemma says is truly unique. "It offers high yields across the UK but is the earliest to mature of any winter barley currently available on the market.

"It's stiff yet offers tall straw which we know appeals to livestock/mixed farmers. It also has both Type 1 and Type 2

barley yellow mosaic virus (BaYMV) resistance for robust control, so has the potential to really stand out," she explains.

Genetic diversity

Because Aretha has been bred in Germany, Gemma says the variety is bringing further diversity to the current genetic pool available, to help mitigate the risk of resistance and 'breakdown of genetics'. Aretha (STRG 283/18) is currently a candidate variety.

With interest in pulses increasing, the final variety in the immediate pipeline from Cope Seeds is white pea, Marler. "Marler promises exceptional performance as the highest yielding white pea of any listed or candidate variety. With consistent performance across various sites and good resistance to downy mildew, it's set to make its mark in the spring of 2026," explains Gemma.

As well as bringing valid new material to growers, she says these varieties also signify a change in direction for Cope Seeds. "We really believe in the genetics we're bringing over to the UK — we exist as a company to offer choice to all growers, not just organic.

"However, we'll continue to service that specific segment of



Ted Williams believes the days of 'barn fillers' are over due to increasingly expensive crop inputs.

Providing a different perspective on seed choice is Agrovista with Group 4 winter wheat Mindful, part of the company's exclusive range of wheat and barley varieties.

Mindful offers a sound combination of disease resistance ratings, high specific weight and consistent yield performance across differing regions, back cropping and drilling dates, says arable seed product manager, Ted Williams.

"But it's not just a good variety, 10% of seed sale profits go to farming mental health partner charities — FCN and

RSABI — which is particularly relevant in a season like we're experiencing," he continues. "Agrovista is striving to do the right thing by growers in every way to give back to them where we can."

In terms of disease scores, Mindful offers an 8 for mildew with a respectable 6 for yellow rust and 6.3 for septoria.

Top performer

As for performance, Mindful achieved the top mean yield across Agrovista's AgX trial sites in 2021 and 2022 at both extremes of the sowing window. Drilled in September 2022 it produced 14.89t/ha; late sown in November the same year it gave 15.44t/ha.

"That said, the days of 'barn fillers' are over," comments Ted. "Crop inputs are becoming increasingly expensive so having a portfolio of varieties to meet the requirements of an individual farm and its associated agronomics is important.

"For the farmer, this means choosing varieties with complete packages that can provide more flexibility in drilling dates such as Mindful," he says. ■



10% of seed sale profits from Mindful go to farming mental health partner charities FCN and RSABI.

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Compelling conventionals

Conventional OSR

Should growers still consider conventional oilseed rape varieties when the majority of options on the market are hybrid and wider risks associated with the crop remain high? CPM investigates.

By Janine Adamson

While there appears to be a steady wave of conventional oilseed rape varieties entering the market, the majority of options available to growers continue to be hybrid. So where do conventional OSR varieties fit and what are the reasons for selecting them?

According to Grainseed's Neil Groom, the battle continues based on the myth that hybrids are more vigorous than conventionals. "This isn't what we see in trials or in the field," he stresses.

"Vigour is a feature of the individual variety, not whether it's conventional or hybrid. Whereas some hybrids show more vigour, certain conventionals are very vigorous too."

A recent new launch is Pi Pinnacle from Grainseed which entered the AHDB's Recommended List last winter as the top performing conventional OSR for both gross output and treated yields.

"In AHDB RL trials last year it yielded 103% gross output in the East and West region (with 104% treated yield) and 101% in the North (with 102% treated yield), taking the number one spot for

conventional varieties in both regions," says Neil.

He adds that Pinnacle is not only the number one conventional variety, but is also one that's been bred in the UK by independent plant breeder, Mike Pickford, who's been focusing on the conventional OSR market for more than half a century.

Using a classical 'pedigree' method where single plants are selected in successive generations and a record is maintained of the parent-progeny relationships, Mike has successfully bred 18 varieties to date.

UK-centric breeding

He says he specialises in conventional varieties which are ideally suited to UK conditions, all of which are initially developed from his home in the Cotswolds. "My breeding philosophy is simple — to improve individual yield components such as increasing the size of the seed — it's all about yield."

"For this, I select plant types which exhibit a high harvest index, which means a high ratio of seed yield to total plant biomass. This involves analysing components such as pods per plant, seeds per pod and the size of the seed," explains Mike.

"Using this method, Pinnacle stood out because it has a high harvest index with above average scores for all components, including a thousand grain weight between 6.5-7g."

Mike also strives to maintain clean green stems which he says allows more efficient photosynthesis during the ripening grain filling process.

Again, this is a characteristic which Pinnacle exhibits. "Furthermore, it ripens medium to early which ensures the OSR

“New conventional, open-pollinated varieties offer high yields and display similar levels of vigour to hybrids.”

harvest is completed before first wheats are ready to be cut so following crops can be planted in good time," comments Mike. "And it's a consistent performer, year on year."

Pinnacle also scores well in terms of



According to Neil Groom, vigour is a feature of an individual variety, not whether it's conventional or hybrid.



Mike Pickford says his breeding philosophy is simple – to improve individual yield components such as increasing the size of the seed. Pictured with companion, Flynn.

light leaf spot (7) and has good verticillium resistance [7]. But one stand-out advantage of conventional varieties over hybrids can be a reduction in seed cost, says Neil.

Neil explains a 'good hybrid' can cost around £250 per 1.5M seeds/3ha bag. At £145 per 2M seed bag for Pi Pinnacle, growers can purchase 1.7 bags [to spend the same £250]. "Sown at a rate of 80 seeds/m², this equates to 4.25ha of seed, so you can drill more than an extra hectare for the same spend," adds Neil.

Risk mitigation

This is an important factor when external aspects such as cabbage stem flea beetle or pigeon damage are at play, he says. "If pest pressure is too great or the weather isn't favourable, you can pull it up, plant a different crop and the losses are minimised.

"And of course, for those who farm-save seed, current legislation excludes hybrid OSR varieties meaning only conventional varieties are approved. Farm-saved seed is estimated to account for 50% of sowings which isn't insignificant," points out Neil.

Elsoms Seeds is also advising growers and

agronomists to reconsider conventional OSR varieties based on their targeted traits, agronomic merit scores and shorter breeding cycles.

OSR breeder Mark Nightingale has worked with the crop for more than 20 years and says although there's been a rise in the popularity of hybrids based on their reputation for enhanced vigour, new options could tip the balance back in the favour of conventionals.

"New conventional, open-pollinated (OP) varieties offer high yields and display similar levels of vigour to hybrids. Although OSR prices are currently lower than in recent years, we still annually import 1.5M tonnes of oilseeds into the UK, so market demand is strong.

"It's worth noting that we can breed new conventional varieties far faster than hybrids, so the cost of conventional seed is often much lower which can make a significant difference when it comes to lowering upfront costs and mitigating risk when establishing the crop," he explains.

Mark stresses that despite other strong and well-established economic and agronomic arguments for conventional varieties, there's little doubt they've been overlooked when it comes to OSR variety selection.

"Currently, no one's bred a variety that's resistant to CSFB and the current trend towards early establishment has prompted growers to become overly reliant on over-year-old seed which tends to be less vigorous, regardless of whether it's a conventional or a hybrid variety.

"To combat the threat of CSFB, Elsoms is selectively breeding new varieties which can cope with higher larval loads. And, because breeding cycles for conventional OP varieties are much shorter than for hybrids, we've found that OP varieties can adapt to this ►

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► selection pressure much quicker than when breeding hybrids,” he continues.

“This recent breakthrough is just one element of a wider risk mitigation strategy for growing OSR more successfully.”

New developments

Elsoms’ new conventional varieties are Powerhouse, Firebird and Hallmark, all of which are currently in AHDB candidate trials. “Powerhouse has exceptionally high seed yields, Firebird combines a high gross output with built-in Turnip Yellow Virus (TuYv) resistance, whereas Hallmark offers diversity in genetics with very high oil content and excellent verticillium resistance,” says Mark.

So despite these benefits, what’s steering growers towards hybrids? It’s really down to the promise of vigour? Ted Williams, arable seed product manager at Agrovista, believes the move towards hybrid OSR has been due to a number of factors. “It’s easier to stack genetic traits in a hybrid such as clubroot resistance, pod shatter and of course the development of Clearfield varieties.

“With pod shatter resistance, this can add an extra 7-10 days flexibility at harvest which is useful in catchy conditions,” he says. “And now, the stacked traits found in new hybrid varieties come with less, if any,



Mark Nightingale says there’s little doubt conventional OSR varieties have been overlooked in recent times.

yield lag. It’s understandable why they’ve become popular.”

However, Ted doesn’t dispute that there remains a place for conventional OSR varieties. “It’s becoming increasingly difficult to establish a crop of OSR but with conventionals, you plant up to twice as much seed than you do with a hybrid. With more seed there’s a greater likelihood of the crop establishing and beating autumn pest pressures — essentially, it’s a numbers game.”

To encourage growers to keep OSR in rotations as a valuable break crop option, Ted says Agrovista launched Codex – a conventional variety which comes with a risk-share scheme. “Codex is sold without royalties at the time of seed purchase, with the fee collected at a later date based on the surviving crop.

“As a variety, it has good autumn and spring vigour not dissimilar to Campus (KWS). It has the maximum score for stem canker resistance (9) with a high resistance to lodging (8) so proves to be a solid variety with robust agronomic features,” he continues.

“Although the rest of Agrovista’s OSR are mostly hybrid varieties, Codex is a valid alternative for those looking for a conventional variety which establishes quickly,” concludes Ted. ■

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“It’s the first variety we’ve brought to the market with both the *Rlm7* and *RlmS* genes.”

Insider’s View: OSR

The name Maverick might forever elicit the *Top Gun* theme tune, but could the latest oilseed rape variety of the same name take the crop out of the danger zone by helping growers spread risk on farm while achieving strong yields? *CPM* debriefs.

By *Melanie Jenkins*

A maverick might mean to be somewhat unorthodox, but in relation to NPZ UK’s (formerly LSPB) oilseed rape iteration it suits this definition so far as it’s kitted out with both the *Rlm7* and *RlmS* phoma resistance genes, along with turnip yellows virus resistance in one neatly packaged high output hybrid.

An AHDB candidate variety, Maverick already looks set to offer growers potential for the coming season, with NPZ UK’s Chris Guest highlighting that not only is it one of the highest gross output varieties coming to the market at 108%, it also offers a rounded agronomic package.

One thing Chris notes is that Maverick’s yield performance in the North region isn’t as high as had been hoped, currently at 103% of control, but he also highlights that there’s limited data available so far.

“Maverick amalgamates TuYV and phoma resistance with a strong seed yield

and oil content which combine for a high gross output. The variety really stood out last year when its late season stem health was very noticeable, with strong green plants that didn’t show signs of premature senescence.”

Genetic promise

Hutchinsons’ David Bouch is encouraged by Maverick’s gross output and oil content, along with its disease resistance which he believes looks promising. “This variety provides not just a different set of genetics, but genetics with a favourable array of good agronomics to help growers spread risk on farm.”

The variety has demonstrated consistent performance in trials across the UK, France, Germany, Switzerland and Denmark, says Chris. “It’s done well over the past few seasons which have all had very different climatic conditions which is reassuring as we don’t know what crops will face one season to the next.”

One of the variety’s key attributes is its overall disease resistance portfolio, says Chris. “Maverick’s a game changer because it’s the first variety we’ve brought to the market with both the *Rlm7* and *RlmS* genes, alongside other sources of resistance. This double phoma resistance aspect is becoming really important as we’ve seen a slippage in *Rlm7*’s effectiveness following a change in the phoma population, as well as greater focus on maintaining stem health.”

Although the performance of *Rlm7* has started to weaken, it’s certainly not a thing of the past, observes David. “The

resistance is being challenged so it’s particularly beneficial that Maverick also has *RlmS* present in its genetic profile.”

According to ADAS’ Dr Faye Ritchie, in later drilled crops where plants tend to be smaller, phoma is more of a risk so this is where there’s the greatest benefit from better disease resistance. “Having both resistance genes is far more beneficial for genetic resistance management as it means we aren’t reliant on a single gene.

“We also know that there are strains of the phoma pathogen which is virulent against *Rlm7* in the UK,” she explains. “So this is another reason why it’s important to not rely on one single major resistance gene because this can increase the speed at which its effectiveness is lost, whereas combinations of major genes can greatly increase durability of resistance. Growers



An AHDB candidate variety, Maverick already looks set to offer growers potential for the coming season, says Chris Guest.

Will Maverick fly?

have options to spread their risk by planting a mix of genetic backgrounds on farm which should help to prolong the longevity of growing OSR varieties. Having strong disease resistance can also provide flexibility for fungicide applications and timings."

Additionally, Maverick scores 7 against light leaf spot and in NPZ yield versus disease resistance trials in Switzerland, Maverick came out on top with the highest scores for LLS and phoma, adds Chris.

Faye notes that the tendency for growers to drill earlier to get crops away from cabbage stem flea beetle can result in a greater prevalence of LLS, meaning the variety's resistance score is important. "It's also notable that Maverick has TuYV resistance as this removes a further risk when growing the crop."

However, because Maverick has come from NPZ UK's MSL breeding programme this means that it doesn't have the pod shatter resistance gene, says the firm's breeder, Craig Padley. "Despite this, it came through Harvest 2023 very well and at our Wisbech trial site in Cambridgeshire, where there was a lot of seed loss, Maverick held onto its seed as well as the Ogura-bred hybrids we had in trial. This has been backed up by the main harvest



Maverick has demonstrated consistent performance in trials across the UK, France, Germany, Switzerland and Denmark.

trial in Germany where one plot was harvested at the right time, and another was purposefully delayed by up to 10 days without yield loss."

David says he prefers varieties to have pod shatter resistance but acknowledges it's possible to manage varieties without it. "In an ideal world it'd be great if all varieties had it, but as 25-30% of the market consists of conventional varieties, none of which have pod shatter resistance, this means plenty of growers are applying Pod-Stik to take crops through to harvest.

"Other than not having this trait, Maverick looks strong and growers

can utilise it to spread their risk among varieties that do have pod shatter but may be weaker elsewhere."

And Chris believes the variety's verticillium tolerance will outweigh having pod shatter in more seasons than not. "The way that genetics work, we'd potentially lose out on another attribute if we had pod shatter resistance, and verticillium is an important disease to consider especially when opting to drill early."

Agreeing with Chris, David acknowledges how damaging verticillium can be. "I don't think the disease is considered as important as it should be but it can cause significant






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NPZ UK believes Maverick can work in an early drilling slot.

► damage that can polish a crop off. It's reassuring to see that Maverick has some useful tolerance against it as this will assist growers with their management of the crop."

Craig points out that the combined resistances of LLS

and phoma as well as verticillium tolerance means the variety has very good stem health. "We've seen in varieties susceptible to verticillium that they can senesce two weeks early, meaning small pod seed size and reduced overall yield.

Top class rehearsal

Maverick is in the process of proving itself on Ben Cannon's farm in Hertfordshire. Hyde Hall Farm consists of 250ha owned and another 500ha contract farmed land with a mostly arable focus. Ben grows spring barley after cover crops, winter beans as a soil conditioner, as well as spring beans, soft wheats and has persisted with oilseed rape while others have moved away from the crop.

Although Ben is growing Maverick for NPZ UK, the crop isn't for seed but instead acts as a farm-scale field trial. "We farm it just as we would if it wasn't a trial, but we use drones to photograph it weekly to plot its development against other varieties, and use yield mapping via the combine so we can accurately see the results come harvest.

"I have 45ha in the ground at the moment, of which around 10ha is Maverick, that was direct drilled the first week of August into stubble without base fertiliser or a pre-emergence.

"We try to grow OSR on a low-risk basis as there's potential from cabbage stem flea beetle damage, but we've been very fortunate and never had to write a crop off. Growing hybrids over the past few years has

certainly helped as they're more vigorous at growing away from the pest," explains Ben.

He also believes that by introducing digestate as a fertiliser, it's helped to deter adult CSFB from the crop. "This is only based on anecdotal evidence, but it appears that the smells puts them off."

One aspect he finds quite daunting with hybrid varieties is drilling at such a low seed rate. "We drilled Maverick at 3.5kg/ha but other varieties went in as low as 2kg/ha which is way down on the 6kg/ha that we would have drilled with conventional varieties."

Maverick has been a noticeably vigorous variety, with plants looking strong going into the winter, says Ben. "We didn't have any trouble with pigeons and once the crop was up we applied digestate with Bortrac (foliar boron) and Astrokerb (aminopyralid+ propyzamide) in February, followed by a universal biological and nutrient feed in April.

"The crop is very even throughout all of the fields," observes Ben. "Usually, we get sketchy growth on the headlands but the wet autumn has resulted in the crop being really even."

Ben used Propulse (carboxamide+

But we've trialled Maverick at our Cambridge and Wisbech sites which suffers with high pressure from the disease and it's shown good tolerance to it."

Maverick is a stiff strawed variety, reducing the risk of it lodging or being weak, notes David. "It has stronger straw than some of the other varieties on the AHDB's Recommended List, meaning it ticks a lot of boxes."

Hybrid breeding programmes have allowed for advances such as the combined phoma resistance, but breeders are constantly trying to overcome other threats faced by OSR, says Craig. "It's a big challenge trying to breed varieties capable of mitigating the impacts of climate change; ►



David Bouch is encouraged by Maverick's gross output and oil content, along with its disease resistance which he believes looks promising.



Maverick has been a noticeably vigorous variety with plants looking strong going into the winter at Hyde Hall Farm in Hertfordshire. Photo: Charlie Cannon.

triazolinthione) at mid-flowering to round off pesticide applications and notes that he hasn't had to spend a lot on it as it's looked very clean. "Also, because Maverick has been vigorous, and the canopy's been so thick it seems to have stifled the grassweeds."

In terms of fertiliser, the crop received 250kg/ha of ammonium sulphate and 300kg/ha of urea, which takes the total amount of nitrogen applied to 190kgN/ha.

"I've pushed it hard in this respect because the crop has looked well. Although I go for a low-risk

approach, if a crop appears to have potential then I'll apply inputs accordingly."

He hasn't used foliar N due to having tried it in the past and not seen any yield benefits. "I also don't use Pod-Stik but have insurance against thunderstorms and hail instead as we lost the entire crop to that five years ago."

If Maverick can achieve a yield of 3.5t/ha Ben will be pleased with its performance. "We hit a yield ceiling on farm some time back, so anything above that is great and if Maverick can average this then I'll be happy."



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Source: AHDB Recommended List (E/W) 2024/25

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Faye Ritchie notes that the tendency for growers to drill earlier to get crops away from cabbage stem flea beetle can result in a greater prevalence of LLS, meaning Maverick's resistance score is important.

► varieties that can cope with droughts and higher temperatures, or prolonged cold and wet periods.

"We're also pushing to add the pod shatter resistance gene to our material and to find tolerances to help with the CSFB issue, such as finding varieties that can better withstand the larval load, and we're also evaluating several new clubroot resistances.

"Our internal trials run on a reduced fungicide programme, and we think this has helped improve our selection of more robust and tolerant hybrids which is evident in the disease resistance figures of varieties such as Maverick," he adds.

Looking at Maverick's sowing date, Chris believes it can work well in the earlier drilling slot. "Early drilled varieties are in the ground longer, so having a strong disease resistance profile, such as in Maverick, is even more important. We have later drilled trial plots in the ground at the moment and these are looking very promising, so we hope to see the visual condition translated into gross output."

David has seen September drilled plots of Maverick which he says appears to be in really

good shape. "It's looking promising and demonstrates you can grow OSR at different points of the drilling window and it'll still do well, meaning date is less of an issue than conditions."

Maverick is a vigorous variety producing a high biomass, explains Chris. "In our late sown trials in Wisbech this year we noticed Maverick's growth has been significantly stronger than the other material being grown."

Chris also points out that it's vital to produce OSR varieties that are going to work for growers amid the difficulties the crop has faced. "We have optimism for the coming season and there'll be a good amount of Maverick seed available for growers."

This new addition from NPZ UK is of interest to David as he likes to see new material enter the market. "From a grower's perspective, it's really important to have different genetics from varying breeders available as this helps with risk management," he concludes. ■

Maverick at a glance

Gross output (% treated controls)

UK treated	108.1
East/West region	110.6
North region treated	102.9
Oil content, fungicide treated (%)	46.1

Agronomics

Resistance to lodging	8.5
Stem stiffness	8.2
Earliness of flowering	5.6
Earliness of maturity	5.4
Pod shatter resistance	-

Disease resistance

Light leaf spot	7
Phoma stem canker	9
Verticillium	-
TuYV	R

Source: AHDB Candidate List, winter oilseed rape 2024/54 – [] = limited data.



Oh, oh, oh, it's magic...

Forward-thinking farmers

As growers grapple for ways to stop pests decimating oilseed rape yields, a new digital monitoring tool based on AI could be key. *CPM* finds out more.

By Charlotte Cunningham

From self-parking cars to chatbots writing dissertations, artificial intelligence — AI — is everywhere you look in 2024.

But what exactly is AI, in its simplest form? The Oxford English Dictionary describes it quite neatly as the study and development of computer systems that can copy intelligent human behaviour — essentially, meaning it's now possible to train computers to do things humans would otherwise have to.

Agriculture is one of the industries cashing in on the benefits of this, using AI to carry out a variety of functions such as monitoring livestock health, predicting crop performance and even bringing self-driving tractors to market.

Among the firms exploring the depths of the potential functionality of AI is Bayer. The company is no means a new player in the AI game, with its various tech including FieldView and crossbred breeding programmes all based on computer learning.

But ever-keen to expand its offer further, Bayer launched a brand-new AI-based pest monitoring tool at this year's Cereals Event. Named MagicTrap, the tool is what Bayer is calling an automated, next generation digital yellow water trap, which provides continuously updated information on pest pressure in oilseed rape crops.

By automating this monitoring, Bayer says it hopes to make managing key OSR pests easier at a time when control options are limited, explains the firm's Max Dafforn.

Market launch

Looking at its journey to market, MagicTrap was developed by a team of European colleagues in Germany at the Crop Protection Innovation Laboratory (CPIL), explains Max. "This team are based on farm and are responsible for developing a range of new decision support tools.

"MagicScout was the first product to come out of the CPIL — as we call them — and was designed to help farmers and agronomists move from pen and paper to app-based recording and also incorporated AI technology to automatically identify different pests, weeds and diseases via images captured on the users's smartphone."

Max says MagicTrap was the next step in that evolution, to try and automate field observations even more so. "With standard yellow water traps proving impractical for many because of the time involved in

“AI is going to have a huge impact on agriculture.”

checking and identifying their contents, MagicTrap provides a valuable extra layer of information on pest migration and pressure.” ►



MagicTrap is what's called an Internet of Things connected device which allows growers and agronomists to remotely monitor pests in OSR in real time, explains Max Dafforn.



James Fortune says trials with MagicTrap gave a slightly earlier indication of pest pressure that would give enough time to adapt the plan and get a spray on before any severe damage occurred.

► So how exactly does it work?

"MagicTrap is what's called an Internet of Things connected device which allows growers and agronomists to remotely monitor pests in OSR in real time," explains Max.

"Similarly to MagicScout, at the core of MagicTrap is sophisticated artificial intelligence image recognition which automatically identifies species captured by the on board, solar-powered high-resolution camera module attached to the trap.

"Once identified, the technology automatically sends this information to the MagicScout smartphone app, sending an

alert to the grower if pest thresholds are reached."

In terms of usability on farm, MagicTrap is solar powered with a seven-day battery back-up and a water reservoir topping-up trap levels for up to three weeks. A specially designed grid also prevents bees from entering the trap, he adds.

CSFB challenge

Though MagicTrap is able to identify several pests, including pollen beetle and weevil, continued pressure and limited solutions for cabbage stem flea beetle infestations makes the innovation particularly interesting for UK growers, believes Max. "Since the ban on neonicotinoids, cabbage stem flea beetle has become an increasing problem and is making growing OSR more of a challenge. Pyrethroids are now the only real chemical option when it comes to control.

"However, we know there's now widespread resistance to these products and growers have to be very selective with their usage and timing of any applications to get the most from them.

"Therefore, the only way to effectively grow OSR is to adopt IPM strategies, and we feel that MagicTrap could really support this. The first step in any IPM approach is to monitor and measure and that's exactly what MagicTrap is designed to do."

In terms of how the tool can be used to support wider decision making on farm, Max says last year the traps were rolled out to growers and agronomists in trials



Gareth Bubb says MagicTrap is an important tool in the armoury to help growers make better decisions and hopefully get the most out of what's already a very challenging crop.

and the feedback included everything from prompting more visual inspections of the field to tweaking insecticide programmes based on the pressures the trap revealed.

As well as this, Bayer has been testing the technology at its Callow site with the firm's Gareth Bubb overseeing some of the trials. "We drilled a crop of OSR last September and put the trap in the field around the same time and monitored the crop from that point."

Despite presumptions that the key migration period for flea beetle occurs late August, Gareth says something he was surprised to see in the trials was a peak of activity between 23-30 September.

Views from the field

In the field, VCS research consultant agronomist James Fortune has been impressed with the extra level of confidence MagicTrap gives when it comes to deciding on insecticide applications.

"I trialled MagicTrap on a farm in Norfolk in early autumn last year, with the aim of looking at peak flea beetle migration timings in more detail," he explains. "We wanted to see if it would correctly identify beetle pressure, and from that, be able to make a decision on applying insecticides based on known peak risk timings, rather than just when we presumed it would be.

"Being in the East of England, beetle pressure is high, so any tools we can use to help sense check what we're doing is going to be really important really important," stresses James.

The crop was monitored via his smartphone and James says the technology worked really well, correctly identifying the beetles, and in fact

gave him a heads-up regarding pest thresholds, compared with neighbouring fields where the trap wasn't used. "We saw a slightly earlier indication — a day or two — which would give enough time to adapt the plan and get a spray on before any severe damage occurred.

"I see it being a really useful indication and decision support tool for growers and adds a greater level of accuracy to an important monitoring process. It's a really useful tool."

Similar results have also been observed in Hampshire by AICC independent agronomist and CCC Agronomy technical director, Peter Cowlrick.

"You can't be on every farm every day," he says. "Trying to assess the migration patterns of something like cabbage stem flea beetle is pretty challenging. None of us want to use insecticides unless we actually have to, but we

simply have to manage cabbage stem flea beetle larval numbers.

"What I particularly like about MagicTrap is that it's automated. It provided us with images twice a day and CSFB identification from those images were very accurate, as were the count numbers."

Combined with physical inspection for foliar damage, the remote monitoring supported a decision to apply a pyrethroid insecticide at the 4-leaf stage of the crop.

Subsequent CSFB larvae numbers in the treated crop were found to be low — around 2-3 per plant — and hadn't impacted crop growth, whereas larval infestation numbers were noticeably higher in other fields on the farm that weren't sprayed.

"Without MagicTrap, the decision to spray would have been based more on gut feel," he says.

"Interestingly, we've historically had a bit of a challenge with OSR establishment and it does make you wonder if this has previously been due to the timing of drilling versus when key infestations have actually occurred."

Gareth says having access to this greater depth of information can prompt further management changes, all in a bid to get the most from OSR. "For example, if you're going to switch to planting OSR in the ground in late September, you're going to perhaps have to select a different variety — something that's really vigorous, for example — but having this information can help better justify those decisions."

"It's not a silver bullet, but it's an important tool in the armoury to help growers make better decisions and hopefully get the most out of what's already a very challenging crop."

Max continues and says an area of use which he sees as having huge potential and value is when growers get the traps out in the field before the crop is drilled.

Volunteer attraction

"We suggest putting the trap where you've had OSR the previous year and you have volunteers in the stubble — the flea beetle and other pests will be attracted to the volunteers, so it'll give a really good indication of the pressure on that particular farm. This information can then be used to form the basis of drilling date decisions."

"Because of pest pressures, many farmers are now either going very early with their OSR drilling to try and get crops up and away to withstand any damage,



Sharing information between MagicTrap users could help to build an accurate picture of regional pest pressure



Last year the traps were rolled out to growers and agronomists in trials and the feedback included everything from prompting more visual inspections of the field to tweaking insecticide programmes based on the pressures the trap revealed.

or they're going later after the main flea beetle migration window has passed. By having traps out in the field and continually monitoring this, it'll allow growers to make a more informed decision about exactly when to drill."

Looking to the future, work is already underway to expand the algorithms and 'teach' the computers to identify more pests in a wider range of crops, adds Max. "It's continuously evolving and the more information we feed into these systems, the more accurate and expansive they're going to get. In Germany, the system has now received almost one million images back from traps in the field."

Another area Bayer is keen to explore as MagicTrap is rolled out is the value of the data from networks of local traps. "We believe that sharing of information between MagicTrap users could help to build an accurate picture of regional pest pressures and help these growers

to strengthen their approach to tackling them."

"There's no doubt in my mind that AI is going to have a huge impact on agriculture and tools like this are just the tip of an exciting iceberg," concludes Max. ■



Since the ban on neonicotinoids, cabbage stem flea beetle has become an increasing problem and is making growing OSR more of a challenge.

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Pulse Progress

Planning for pulses

With a focus on legumes in a number of the options available under the new SFI scheme, experts warn that careful consideration should be given to how they're grown to avoid future problems. CPM finds out more.

By Charlotte Cunningham

Although from the outset the SFI scheme looks to benefit both crop and soil health, and the wider environment, lack of careful planning when it comes legume-containing options could negatively impact the longer-term outlook for pulses.

This is according to the Processors and Growers Research Organisation, which is warning growers to be cautious when it comes to selecting and growing new SFI options during the coming year.

"As a general overview, the SFI is positive and there are several options available to growers that have good payments attached to them," explains PGRO's Dr Becky Howard. "That said, a number of these will likely include legumes

in the mixtures and will therefore require careful management."

Becky says that options, including NUM3 and IPM3, encourage either longer-term or frequent short-term use of legume species. "There's also the AHL1 pollen and nectar flower mixture which features a high percentage of legumes in some of the blends — up to 99% in some cases."

The challenge with this, she says, is that because both the options and the time period said mixtures will be in the ground for is a new concept, little is known about how species will interact with each other — from a disease, virus and pest perspective.

Previous research

"We've previously undertaken work looking at the risk of soil-borne diseases with cover crops and peas which actually showed few negative interactions — and these mixes included components like vetches and clovers," explains Becky. "The benefits in terms of crop health and soil structure have outweighed any potential risks with soil-borne pathogens, although it's important to stress we haven't conducted the work in beans so we're unsure whether the same results would be seen."

However, Becky warns that in these situations, the mixtures are likely to be in situ only for a short period of time whereas issues could indeed arise when grown over a longer term. ►

“For the sustainability of the UK pulse industry, it's vital that options are selected and managed effectively to prevent future issues.”



Becky Howard believes soil-borne diseases are of biggest concern as they can build up over time and increase each time a legume is grown leading to crop failures.



In terms of key diseases, the foot rot complex – including fusarium, didymella and aphanomyces – are likely to have the biggest impact.

► “With SFI, the key thing to remember is we don’t know how these mixtures are going to interact because they’re new options. There’s likely to be considerable uptake this year due to many growers being unable to plant spring crops and effectively only being left with these legume mixtures. So while we don’t want to discourage people from using these options, it’s important to keep in mind a lot contain legumes.”

So what exactly are the risks growers should be aware of? “Soil-borne diseases are probably the biggest concern as they can build up over time and increase each time a legume is grown which can lead to crop failures. For example, if you have a legume — such as a vetch or a clover — in a legume fallow which hosts the same soil-borne pathogen as a pea or bean, and you’re growing them every one in three years, that disease level is going to increase rapidly.”

Looking specifically at key diseases to be aware of, the foot rot complex — including fusarium, didymella and aphanomyces — are likely to have the biggest impact, says Becky.

“*Fusarium avenaceum* has several other legume hosts including clover, faba bean, lucerne, lupins, berseem clover, crimson clover, Italian ryegrass, black oat, perennial ryegrass, reversed clover, red clover, vetch, and white clover. Any damage caused by the presence of the disease may be seen in lupins, red clover and white clover.”

Root damage

“*Fusarium solani* is hosted by faba bean, pea, lucerne, phaseolus bean, and chickpea. In peas and phaseolus beans the disease can cause serious damage to roots, leading to plant failure.” Although little is known about host or multiplication for other mixture species, it’s generally considered to be of low risk in vetches and clovers, she adds.

Where *Fusarium culmorum* is present, it’s responsible for ear disease in wheat and crown rot in sugar beet. “Hosts include oats, barley, brassicas, sugar beet, lentil, perennial and Italian ryegrass, wheat, and faba bean, and field beans shouldn’t be planted directly following these crops where disease has caused

noticeable infection.”

Moving onto aphanomyces, hosts include peas, clover, faba bean, lucerne, phaseolus beans, berseem clover, red clover, vetch, white clover, with severe damage likely in peas, phaseolus beans and berseem clover where the disease is present, explains Becky.

“Finally, didymella is both seed and soil-borne and is hosted by clover, faba bean, lucerne, lupins, phaseolus beans, peas, berseem clover, crimson clover, reversed clover, red clover, and white clover. Phaseolus beans, peas, lupins and red clover may show significant damage from didymella and its presence can lead to strong multiplication of the pathogen in soils.

“All of the diseases listed have potential to carry over from SFI options to pea and bean crops, with fusarium species likely to cause most damage due to thriving in slightly warmer conditions — 20-30°C — on wet soils with neutral pH, or when plants are under drought stress.

“That said, all of the diseases form persistent soil-borne spores that survive for several years in the absence of a host and are multiplied in soils by their main hosts.

“The crucial thing to remember here is there are currently no chemical options to tackle any of these diseases, meaning good rotational and soil management planning are the only way to mitigate the risk. With a whole field option like NUM3, our cautious feeling is that you should probably treat it as a legume crop and grow it every one in five years to minimise risk,” says Becky. ►



Black bean aphids are key transmitters of viruses including bean leaf roll virus and pea enation mosaic virus.

Legume options

SFI options that must or are likely to include legumes in seed mixtures are as follows:

- NUM2 - Legumes on improved grassland
- NUM3 - Legume fallow
- IPM3 - Companion crop on arable and horticultural land
- SAM2 - Multi-species winter cover
- AHL1 - Pollen and nectar flower mixture
- AHL2 - Winter bird food on arable and horticultural land

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Viruses in peas and beans can lead to significant yield and quality losses but as a complex notion, it's not just about the viruses but also the aphids that transmit them.

► Soil structure also has to be well maintained as this is a strong factor linked to foot rot diseases — the poorer the structure, the worse the impact of soil-borne diseases, even if there's a low burden to start with, she adds. "There's a really good resource online called 'Best4Soil' which I'd encourage growers to consult if they're unsure about which mixtures to grow — or of course, they can contact PGRO."

Becky says that viruses would then be her next area of concern due to some of the species in cover crops and fallow mixtures also being potential hosts of the same aphids or viruses that can occur in peas and beans.

"Viruses in peas and beans can lead to significant yield and quality losses, but it's quite a complex notion as it's not just about the viruses but also the aphids that transmit them, what their overwintering hosts are, and the previous cropping."

Bean leaf roll virus is a persistent virus, with losses of up to 50-90% recorded, which causes stunting, chlorosis of upper leaves and leaf roll. "It's persistently transmitted by both pea aphid and peach-potato aphid — but not by seed — and is hosted by many legumes including faba beans, peas, lucerne, red clover, sainfoin, and white clover," she explains.

Other key viruses to consider are bean yellow mosaic virus (pea common mosaic virus), broad bean true mosaic virus, pea enation mosaic virus, pea early-browning virus, pea seed-borne mosaic virus and

turnip yellows virus, she notes.

In terms of overcoming viruses, again the options are limited with only some managed by early applications of aphicides, however these aren't overly effective in pulses, warns Becky.

Pest-wise Becky says bean seed fly larvae damage is something to consider. "Larvae are hosted by more than 40 plant species and the flies overwinter as pupae in soils. As such, there's potential for carryover from one legume to the next if there's only a short period between destruction of an SFI option and the following legume crop in spring and summer.

"The main damage to pea crops occurs when they're established in late spring from mid-April onwards. Adults invade crops at drilling, laying eggs around the area where seed is planted. Larvae feed on seeds and seedlings shortly after planting leading to seed and stem tunnelling."

Crop failure risk

"In peas, this leads to the development of multiple shoots or plant death, while in green beans plants aren't able to compensate for the damage and high levels of plant death may occur. Establishment losses due to this pest may be high as the adults aggregate in large numbers, and higher levels of damage occur when green weed material or crop debris persists in soils, in soils high in organic matter and when soils are freshly disturbed."

Looking at the collective risk, Michael Shuldhham, president of Pulses UK and pulse product manager at NPZ UK (formerly LSPB), shares Becky's concerns.

He says should widespread disease, virus and pest problems occur due to a surge in uptake of SFI options, it could have a huge impact on both domestic and global pulse markets.

"There's a huge increase in both interest and demand for homegrown pulses in the UK at the moment — for both livestock diets as the industry moves away from soya-based rations and alternative sources of protein for human consumption," he says

"It's a thriving market and there's an awful lot of work going into ensuring pulses remain a sustainable, valuable crop for growers. Globally, the UK is one of the biggest producers of faba beans and green peas — something I'm not sure is widely known.

"If growing some of the SFI options



Being unable to grow pulses due to soil-borne diseases could severely impact both domestic and global demand for UK crops, fears Michael Shuldhham.

leads to a surge in soil-borne diseases, for example, there's an unintended consequence that growers are going to find themselves in a position where pulses can't be grown for a long period of time which will severely disrupt these markets."

Reverting back to his point about increasing interest in homegrown protein sources to replace soya, Michael says there might be an unwanted situation where growers actually end up having to use soya again as pulses can't be grown. "Of course, in terms of sourcing this, we'd then be beholden to global commodity markets which in itself is a challenge."

What's more, on the food security front, Michael says he also has concerns about losing oilseed area to SFI mixtures.

Becky concludes: "Although it all sounds quite overwhelming when you go through the risk factors, SFI is a good thing and there are plenty of robust options — with attractive payments attached to them — within the offerings. However, for the sustainability of the UK pulse industry, it's vital these options are selected and managed effectively to prevent future issues.

"This is an ongoing area of research for us and it might be that some of the options end up being beneficial in pulse rotations — creating reservoirs of natural enemies for aphid management, for example — but we just don't know this yet. So in the meantime, erring on the side of caution is what we see as being the best approach." ■

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“It’s asking the question of how we can maximise the value of a maize crop to become more competitive.”

Maize

Maximising maize

Arable growers looking to diversify rotations through introducing maize can further bolster the crop’s income by taking advantage of SFI options. *CPM* weighs up the benefits for first timers.

By Janine Adamson

With the Sustainable Farming Incentive (SFI) offering growers greater flexibility, there’s now the potential to make more of maize in a rotation to help maximise the crop’s value. That’s the message from KWS’ Tom Turner, who believes more arable growers are becoming first time maize producers.

“We’re seeing a move towards maize because of the undeniable benefits, which have come into their own this season when many spring crops couldn’t be planted. Generally, maize is sown from mid-April onwards which means in some scenarios, it was the last conventional crop available to plant,” he explains.

And despite being faced with a challenging spring as just experienced, Tom says many growers would rather drill a traditional crop such as maize if possible, rather than go down a straight stewardship route.

However, the two do work well together,

he points out. “Maize is already a great break crop within an arable rotation because it diversifies cash flow into different income streams, whether that’s for anaerobic digestion, as feed or as grain. Being a spring planted crop, it can also help to aid blackgrass suppression.”

Profitable break crops

“But there’s no denying that oilseed rape is the most profitable option and remains highly appealing where growers can see through establishment challenges such as cabbage stem flea beetle pressure. So it’s asking the question of how we can maximise the value of a maize crop to become more competitive, and SFI offers just that,” says Tom.

The most simple step for arable growers, he believes, is to undersow maize to qualify for IPM3/CIPM3 (companion cropping), which provides £55/ha. This should be done when the maize is at 4-6 leaf stage to avoid damaging the primary crop.

Then, post-harvest in instances where there isn’t a plan for a winter crop or harvest has been late, stitching in two other species alongside the undersowing can qualify for SAM2/CSAM2 (multi-species winter cover) at £129/ha. New entrants will apply using updated codes CIPM3/CSAM2 under the expanded SFI offer for 2024.

“Alternatively, maize growers who have no plans for a following winter-sown crop such as forage specialists, may wish to apply for SOH4 (winter cover following maize crops). This can be accomplished either by maintaining undersowing or by establishing a fast growing winter cover post-harvest. This action pays £203/ha and will be

available for application in July although can’t be stacked with either CSAM2 or CIPM3 thus reducing flexibility from an arable perspective.

“However, these are all strong options which bolster the income from maize yet are simple to manage at a farm level. There are also other actions from 2024’s expanded offer which we’re starting to learn the detail of, such as PRF1 (variable rate application of nutrients) which pays £27/ha and PRF2 (camera or remote sensor guided herbicide spraying) at £43/ha,” explains Tom.

“These two actions can be stacked with a wide range of SFI options, the most profitable combination for maize growers being SOH4+PRF1+PRF2 to yield £273/ha in income.”

Furthermore, he says compared with Countryside Stewardship, SFI seems to be more flexible and therefore accessible for growers hoping to dip their toe in and start to engage. But for those looking at Countryside Stewardship, Tom explains SW5 (enhanced management of maize crops) is most applicable and pays £203/ha, however is more difficult to apply for than SFI.

To rewind a step, with more growers being attracted to maize due to such benefits, some of which will be first time producers of the crop, Tom warns of the importance of conducting adequate research.

“Site selection is the most limiting factor for maize and this should define variety choice, as well as end market of course. For some this will mean only selecting earlier maturing maize varieties which can be successfully harvested before autumn sets

in and it's time to establish a winter cereal.

"Depending on the purpose of the maize, there's also infrastructural requirements such as clamps which many arable farmers won't have," he explains.

"Therefore, it's likely that growing maize as an anaerobic digester feedstock will be the most simplistic entry point for a first-time grower — contracts are available which remove such barriers and make it very easy, although profit margins may be tighter as a result."

Tom also highlights the potential of grain maize, which can be compatible with existing systems on both livestock and arable farms due to it being easy to store after drying or crimping and has the benefit



Augustus KWS was chosen by Martin Hays due to it being an early maturing maize variety.

of a ready-made market.

Contractor Martin Hays farms around 160ha near Chesterfield in Derbyshire. He usually sticks with a classic cereal rotation of winter wheat, winter barley, oilseed rape and spring barley, but weather conditions this season meant it was time to devise a plan B.

Liaising with his agronomist Alison Hardesty of ProCam, the decision was made to grow maize for the first time, drilling around 14ha in the second week of May

Plan B

"It became apparent that by the time the ground would dry up, it'd be too late to drill spring barley and achieve a decent crop at the end. We also had around 25ha of failed OSR to replace, so we decided to split the land between millet and maize.

"Rather than go for the AD market, some of my contracting customers are dairy farmers who struggle to source quality forage maize early enough in the autumn. By teaming up, I've been able to grow maize but without the storage conundrum, because they'll load it straight into their own clamps," explains Martin.

He says so far, maize is ticking a lot of boxes making him question why he hasn't



Martin Hays decided to become a first-time maize grower after poor weather hampered plans to drill spring barley.

grown the crop before. "Not only has it given us another break option, but I've had the opportunity to improve drainage and undertake other field maintenance tasks during the down-time.

"Importantly, we selected an early maturing variety (Augustus KWS) to hopefully minimise the impact on our following rotation which in this case is wheat. Having recently purchased a Mzuri direct drill, the last ►

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Maize

► thing I want is to have to repair damaged land due to difficult, late maize harvesting."

Potential SFI payments have also piqued Martin's interest which he says once stacked, should help to make maize competitive against his usual OSR yields. "The no insecticide action is an obvious one, but I'm also looking at undersowing for next year.

"Not only is this rewarded through SFI, but we're also in the catchment area for the Severn Trent Environmental Protection Scheme (STEPS) meaning we can apply for further grants too. They're not big bites of the cherry, but they soon add up."

Although the crop is already looking promising, Martin says the proof will be in the pudding. "I'll wait and see what happens come harvest. I'm not expecting huge yields given our location and chosen variety, but if it goes well, I can see myself increasing

the hectareage and integrating maize into our long-term rotation," he adds.

Varietal selection

Tom further stresses the importance of variety choice and that growers shouldn't be afraid to ask breeders and agronomists for additional insight. "Maize is a crop whose reputation is improving, but many arable growers and in some respect, livestock growers, aren't overly familiar with it.

"The biggest mistake we see is growers unintentionally selecting varieties which mature too late for the site they're on. Myself and colleagues take calls on a daily basis regarding maize varieties and we're happy to do this for anyone considering the crop or requiring guidance whether that's a KWS variety or not."

He adds that KWS offers a range of options to cater for dif-

ferent growing windows and scenarios, from short season crops such as KWS Temprano (FAO 150), through to maincrop types such as Papageno (FAO 190).

"For the most favourable sites with the longest growing season,

KWS Granturismo (FAO 220) would be a great selection. Together, these varieties offer choice and I'm looking forward to seeing growers give them a chance during the coming seasons," concludes Tom. ■

Undersowing success

For the past few years, Plumpton College in East Sussex has been realising the potential of undersowing its maize crops for both environmental and financial benefits.

The college manages around 40-60ha of forage maize in this way, planting a quick-to-establish Westerwolds variety when the maize is at 4-6 leaf stage, and following a broadleaf herbicide spray.

The Westerwolds is then rolled in the following spring to aid the breakdown of the previous maize stalks which can be brittle after the winter. Around 50kgN/ha is applied early March to kick-start grass growth and encourage bulk with a cut being taken in late April once its reached its best feed value potential. The fields are subsequently put back into maize and the cycle starts again.

Velcourt farm manager Rodney Phair oversees the site and says the initial incentive was the environmental benefits linked with the financial reward for inter-row maize cropping, however, it soon became apparent that it was possible to take a viable cut of silage too.

"The grass grows well and doesn't affect the maize yield which means we can achieve more forage from the same area of land. Furthermore, we can assign other crops to the fields which we would have had to set aside for grass production," he explains.

Rodney states the farm tends to achieve 42t/ha maize yields and the grass doesn't impact its potential. And whereas a cover crop might be sprayed off, the grass ley remains over winter to minimise soil erosion and prevent nutrient leaching.



According to Rodney Phair, the farm at Plumpton College tends to achieve 42t/ha maize yields and undersowing with Westerwolds doesn't impact the crop's potential.

"We're maximising land use while achieving environmental gains — there's a double benefit. The grass also appears to improve the seedbed overall, which helps ahead of maize planting. Because of these benefits, the approach is becoming common practice across many Velcourt-managed farms."

Having this additional forage buffer is valuable for the farm which has 240 Holstein cattle, 50 pedigree Sussex cattle, 100 breeding sows and 250 commercial ewes to feed, says Rodney. "There is the risk of contaminating the silage with maize stalks but this can be minimised with pre-rolling and grouping from the mowers. Otherwise, the only other potential downside is a minimal amount of damage to the maize when drilling the grass, but again, this is negligible.

"On balance, there are few disadvantages and it works very well for us. We'll be continuing to undersow our maize as we progress through this coming season," he concludes.



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Pastures new

As farmers, the unusual weather and the amount of rain during the past year have had a considerable impact on our work and it's affected us all. On this occasion, it was our Prime Minister who was caught in the deluge, as he announced to the nation the date of our next general election.

Now the PM has set the date, we'll endure weeks of listening to different political parties and MP candidates shouting louder than the last about why their policies and plans are better for the country than other political parties.

New policy announcements focusing on growth, housing, health, education and commitments to budgets and taxation are already coming out daily. Defra also made a flurry of announcements ahead of Parliament closing down — an expanded offering for the SFI has been revealed including additional options for tenant farmers, upland farmers and new entrants.

Having knowledge of these further SFI standards, as well as the new hedgerow regulations passing through parliament, will give us a little more certainty with which to plan for the year ahead, as we know what's on offer and what's expected of us (in these two areas, at least).

As this parliament dissolves, so too does the commitment

to maintain the agricultural budget. This leaves Defra and farming in a vulnerable position. The next Secretary of State for Defra will have to argue for farming and environment budget alongside all other departments from the treasury who also want a cut. The funding commitments to Defra from some parties are still unclear — as are their priorities for the money being spent. What will they consider to be crucial outcomes for farming?

The Environment Act sets out clear targets for environmental improvements that the next government will have to deliver on during the next five years, with farming seen as the mechanism by which to deliver these.

This will be the first time the government will set its budget for Defra without any commitment to the old EU requirements, as all Environmental Land Management (ELM) funding is now UK set. As an industry, will we be able to demonstrate value for public money? The cost of food production should be met by the market and the consumer, there should be money in producing food — we shouldn't have to subsidise it at the point of production.

Will a new government look closely at the value for money on the public goods they're paying for through SFI? Farmers being paid for outcomes that regulation and enforcement can deliver without public payment might seem better value for money.

Has our industry done enough during the past few years to champion the public goods we deliver, and the funding required to deliver the outcomes the public wants? With the UK economy in poor condition and limited funds available from government, the pressure on the treasury to trim budgets will be immense.

I've always said, we farmers have a huge opportunity to

demonstrate the range of food, products and services we deliver, and it's clear that the majority of the public cares about nature, the environment and climate change and the impacts they're already having.

If you have the opportunity or willingness to engage with and talk to MP candidates in your area, make sure you ask: what are their commitments to funding budgets for Defra? We have to ensure the future government clearly sees the benefits of supporting farmers to deliver a range of public goods and services, and a stronger market for private goods alongside food production.

We have to demonstrate and link together all of the outcomes our landscape can provide for public health and wellbeing. We should be tapping into the Department of Health budget alongside the Defra budget — we as farmers can help provide improved air and water quality, access to land for mental and physical wellbeing, flood and drought protection and so much more.

We should also be tapping into the climate budget — many climate mitigation measures can be delivered by farmers including tree and hedge planting for shade, shelter and water management, and maintaining soil cover to protect from erosion. Imagine a system

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

@LinesMartin
martin.lines@nffn.org.uk

where a Department of Health is hardly required because Defra works with farmers to deliver healthy food, which creates healthy people, using methods that build and sustain a healthy planet.

Whatever the outcome of this election, the next five years are going to be both interesting and challenging. We can sit on our farms, take what's given to us and complain about it. Or, we can engage and help steer the country's direction by using the ballot box, following up with those that are elected.

Form a relationship with your new MPs and help educate those in power on what farmers require to transition to a sustainable agricultural system in a climate of change.



Farmers have to demonstrate how we deliver climate mitigation measures.



“This year will be our biggest yet but that’s not through aiming to expand, it’s more about making Groundswell the very best it can be.”

A meeting of minds

Groundswell preview

It remains as popular as ever and this year Groundswell promises to bring a host of international perspectives to the field to share knowledge and inspire. CPM speaks to Alex Cherry for a flavour of what’s to come from one of farming’s favourite festivals.

By Janine Adamson

Groundswell has become a unique proposition — the combination of rich knowledge transfer with the chance to attend a mini Glastonbury-type festival. And during one of the trickiest years that agriculture has experienced for some time, the industry undoubtedly deserves something to look forward to.

So with the bar already set pretty high, what does this year’s event have in store? According to event director Alex Cherry, one aspect that Groundswell will always strive to deliver on, is quality content. “We have around 275 speakers across the entire show including the 10 session tents, on-stand demonstrations, safaris and plot tours, with many being new faces.

“In particular, there’s an international flavour to this year’s speaker programme — there’s so much inspiration to be had from different global perspectives — it’s a way of breathing new life into UK farming,” he says.

Among the global voices is Amish farmer John Kempf, founder of regen agronomy consultancy, Advancing Eco Agriculture. John is from Northeast Ohio in the United States and says he’s passionate about the

potential of well-managed agriculture ecosystems which can help to reverse ecological degradation.

As quoted on his website, John states: “I dream of a world where the process of growing food regenerates the land, revitalises rural communities, and facilitates a world where food improves our health.”

Top tier speaks

He’s also the host of the regenerative agriculture podcast, where he interviews leading farmers and scientists involved in ‘cutting edge practices and science to accelerate the healing of soil, crops, livestock, and our relationship to the land’.

Alex says although John is a big player in the global regen ag space, he doesn’t undertake frequent international travel therefore having him on the bill is a true highlight. “I’d say if you can attend only one presentation at Groundswell, this should be John’s first talk entitled ‘Untapped potential in regenerative ag’.”

Then, providing a Canadian perspective, is veteran soil scientist and agricultural engineer, Odette Ménard from Quebec. Odette will be delivering lectures during the show as well as demonstrating the rainfall simulator which displays the effect of rainfall on soils under different management regimes.

But for something completely different, Derek and Tannis Axten will share their experiences of creating routes to market for their 240ha farm in Saskatchewan, Western Canada. This includes building a food-grade seed cleaning plant, flour mill, and packaging line on the farm to add value to their grains.

Derek and Tannis say their goal is to take care of what Mother Nature gave them so Axten Farms is sustainable and can continue

for many more generations. Commenting on their approach, Alex says he’s amazed at what the family can achieve given the farm’s remote location. “It really is in the middle of nowhere,” he adds.

However, it’s not just about America and Canada, Groundswell is welcoming a host of speakers from Europe too, including Josef Holzer. Since 2009, Josef has been responsible for developing the Krameterhof farm, a world-renowned permaculture showcase project in the Austrian Alps.

During his talk at Groundswell, Josef will discuss his expertise in water management, and in particular, understanding its flow through landscapes. He has a fitting talk title of ‘Where water runs, make it walk’.

Aside from the extensive speaker programme, Alex says the team has been working hard to improve a rather less glamorous side — the infrastructure of the



Alex Cherry says Groundswell is designed to bring all strands of the industry together to discuss a better farming future.



There are around 275 speakers across the entire show including the 10 session tents, on-stand demonstrations, safaris and plot tours, with many being new faces.

event. This includes increasing access to fresh drinking water by laying new pipework across the site.

The event's layout has also been reconfigured to improve visitor navigation and reduce the time required to travel from one end of the site to the other, and ultimately, minimise walking between exhibits.

There are more camping and glamping facilities — an aspect of Groundswell which arguably makes it stand out from other trade events. And an update which will be a relief for local residents — time and effort has been spent laying new tracks in and out of the site to help improve traffic flow and reduce congestion.

"This year will be our biggest yet but that's not through aiming to expand, it's more about making Groundswell the very best it can be," stresses Alex.

As for hospitality, he says the team is proud to welcome a greater range of independent food outlets which will be open from 'sunrise to sunset'. "There's an increased interest from the food industry in regenerative agriculture, whether that's

start-up brands or large organisations such as Unilever. We have a full spectrum of involvement and it's important to discuss the opportunities and threats such interest has for regen ag."

Something which the Cherry family is passionate about is the event's focus on education and encouraging new entrants into farming. This year, this is being realised through a new hub for educational institutions known as 'The Study'.

"We'll be bringing 100 agriculture lecturers from universities across the country to share research results and hear from farmers, getting them out of the lab and lecture theatre, exposing them to fresh ideas."

Critical thinking

"We're teaming up to make sure agriculture degrees are bang up to date and that we're equipping students with the know-how, critical thinking and inquisitive mindset that farmers at Groundswell have in spades," explains Professor Tom Macmillan, who's helping to coordinate The Study.

Also new at Groundswell 2024, the team have established a seven-year regen rotation trial using field-scale plots, which will be unveiled at this year's event. "The aim is to showcase a potential rotation which will include no-till potatoes, strip-till vegetables, a two-year clover ley and winter wheat. By setting this up in the demonstration field, we can begin to measure the soil health and other benefits of such an approach which is really exciting," explains Alex.

But what does he think of the other regen-themed events which have recently appeared on the scene? Does he perceive these as a threat to the success of Groundswell? "We're here to inspire so it's fantastic to see other events out there which



A greater range of independent food outlets will be open this year from 'sunrise to sunset'.

share similar messaging, it's all positive.

"In many ways it echoes the mantra of the industry in that it's a collaborative space; we welcome more to the party. Groundswell Festival is designed to bring all strands of the industry together to discuss a better farming future, you won't find a more suitable place to do that and you can have fun at the same time," he concludes.

Groundswell is taking place 26-27 June at Lannock Manor Farm in Hitchin and is hosted by the Cherry family. For further information and to enquire about tickets, visit www.groundswellag.com ■



Improving the site's infrastructure and layout has been a priority for show organisers.

To give a flavour of what's in store, CPM has selected some of the sessions from day one of the festival. The full programme for both days can be found online – <https://groundswellag.com/sessions>

Title	When?	Where?	Who?
Untapped potential in regen ag	26 June 10:00 – 10:55	Big Top	● John Kempf – founder of Advancing Eco Agriculture and KindHarvest.ag
Managing blackgrass in arable rotations	26 June 11.15 – 11.40	The Study	● Dr Stephen Moss ● Lynn Tatnell ● Garth Clark
CROP concept and soil compaction	26 June 12:00 – 12:55	Big Top	● Odette Ménard – soil scientist and agricultural engineer
Regen ag: what's the evidence?	26 June 12:00 – 12:55	Soil Tent	● Prof Jonathan Storkey ● Nicola Randall ● Andrew Neal
Where water runs, make it walk	26 June 1:45 – 3:10	Big Top	● Josef Holzer – water management expert
Living mulches: the future for arable?	26 June 3:15 – 3:40	The Study	● Matt England ● Matt Smee
Loyal to the soil	26 June 4:00 – 4:55	Big Top	● Tannis and Derek Axten – Canadian farmers
Transforming the food landscape at scale	26 June 5:30 – 6:25	Big Top	● Andy Cato ● Henry Dimbleby



Making every hectare pay

Sustainable Solutions

Optimising productivity to return the best profit possible is helping one Kent farmer target long-term sustainability. CPM speaks to him to discover how he's doing this.

By Melanie Jenkins

Taking up farming full-time after the death of his uncle, Kevin Bell had limited agricultural experience, but he's now determined to make every hectare as productive and profitable as possible, setting the farm up to be sustainable in the long-term.

Up until four years ago, Kevin had only occasionally helped out on his uncle Tommy Downe's farm in Charing, Kent, with his main career involving travelling around the world as a hydraulic engineer. But when Tommy became ill, Kevin took on running the farm full-time and has thrown himself into making it as successful as he can. "I'm farming just over 100ha, so I'm aiming to maximise the return on every single hectare."

Whereas Tommy was a plough and deep cultivation man, one of the main changes Kevin has made is to move to shallow cultivations using a low disturbance sub-soiler and a disc drill. "The farm has clay loam over chalk soils which are in

good condition, but we're aiming to reduce the movement of the soil and improve diesel and time efficiency," he explains.

However, he hasn't ruled out using the plough as the min-till approach has had the unexpected consequence of drawing flint to the surface of the field, and after several years, this results in a carpet of stones. "This means there's a lot of wear and tear on the disc drill whereas there wouldn't be with a tine drill, but the flint does help with drainage and warms the soil up."

Organic manures

One of the reasons Kevin continues to move the top 10cm of soil is because organic manures are being reintroduced to the farm. "My uncle used to keep pigs and the manure was used on the arable fields resulting in really good crops, but because the fields are small, it can be a job to achieve big yields due to the large amount of headlands. Although we haven't used a lot of bagged P and K in the past, we're now introducing sewage sludge, digestate and paper waste product to help soils and crop health."

Although the farm does have some grassweed presence, the pressure is low, but Kevin takes a zero tolerance. "My uncle would go around with a sprayer backpack and target every weed but now we've moved to a low disturbance system, this has helped even more."

This season, Kevin has taken a different approach and is mainly growing milling

“I'm farming just over 100ha, so I want to maximise the return on every single hectare.”

wheat on the farm, be it in a first, second or third position due to having to make changes to his rotation. "We have good outlets for the crop in this part of the UK and the premiums looked good so I've



Up until four years ago, Kevin Bell had only occasionally helped out on his uncle's farm but he's now running it full-time and has thrown himself into making it as successful as possible.

planted Crusoe and KWS Extase with the aim of trying to make the milling grade.”

He also grows beans but these haven't fitted into the rotation this year, and previous attempts to grow oilseed rape resulted in the crop being attacked by just about everything, he explains. “My uncle did have an extra 100ha he rented, but I don't have this anymore which means our rotation has fallen out of sync.”

Kevin's agronomist, Neil Harper, has been integral to helping make changes on the farm and provides him with the technical expertise required to aid in making the business profitable. “It's been a challenge taking on the farm and I very much rely on Neil's expertise,” says Kevin.

Together they've begun to soil test and take tissue samples to build up a clear

picture of how the farm is performing and what can be done to achieve more from it. “We've introduced GPS and are bringing in variable rate applications,” explains Neil. “Using technology, we want to look at the finer details to achieve incremental gains that'll allow us to maximise returns.”

“Last year was the first time we really analysed the incoming crop which demonstrated various yields that weren't necessarily high enough, so we want to push these to achieve 9-10t/ha or more. But having assessed where things are, this means we can now push over the next few years to see what we can accomplish,” he says.

In terms of investment, the farm was already kitted out with a full contingent of machinery including a combine. Recently ►



Although the farm was previously ploughed and heavily cultivated, Kevin Bell has moved to shallow cultivations using a low disturbance sub-soiler and a disc drill.

iFarm trials

Kevin Bell's biggest challenge is to push yields up while keeping a watchful eye on growing costs, so his Agrii iFarm trials programme is designed to cover a lot of bases all focused on identifying where efficiency gains can be made in the business.

Being close to the established iFarm run by the Boyd family at John Boyd Farms has already helped provide insight and information with regard to cultivations, varieties and disease control which are informing decisions in his own crop production. “These are challenging times for all involved in farming, so the more we can collaborate and share knowledge, the better it is for everybody,” explains Kevin.

“As a relatively new entrant to agriculture, I'm trying hard to do things correctly using data, investing properly in the crops, doing the right things at the right times and keeping a record of everything so we know what works and what doesn't.”

“We rely a lot on Neil and Agrii's expertise regarding our agronomy and overall management and being an iFarm will play a vital role in helping us to fine-tune our approach as well as, hopefully, providing valuable knowledge for other producers.”

Neil Harper says variety selection, use of soil phosphate activation technology and the role of bio-solutions are all on the cards for the location, alongside evaluation of existing and new fungicides.

“Variety choice is the starting point for all production systems and, being fully focused on milling wheat, this is key for Kevin.

“Crusoe, KWS Zyatt and KWS Extase have been grown successfully to date, but there are new options coming through and we have to

keep on top of these and see how they could work in Kevin's system,” says Neil.

“Although, P and K indices haven't been a problem in recent years, we also want to see if we can make the P work harder on the unit, so we'll be trialling Agrii Start Release soil phosphate activator to make more of this available to plants without adding more into the system.”

Agrii trials have shown bio-solutions can play a vital role early in the season in promoting plant health and increasing green area ahead of fungicide use so the following chemistry can be as efficient as possible, he explains.

“In particular, we want to see if application of peptides to stimulate a hypo sensitive response early on can give plants more 'fight', so we can move to a more nutrition focused approach at TO rather than simply relying on fungicides.”

But existing fungicide options and new chemistry will also come under the spotlight, comments Neil. “One of the advantages of the iFarm approach is we can use full field splits to try out new actives coming down the tracks. So for example, at Kevin's we're looking at Bayer's Iblon (isoflucypram) technology this year and then probably Syngenta's Adepidyn (pydiflumetofen) next season.

“But we don't want to use new chemistry just for the sake of it. Crusoe is a big variety on this farm and the main problem with that is its brown rust resistance, but septoria is less of an issue,” he says.

While many of the new fungicides control brown rust, they're focused primarily on septoria control, explains Neil. “So we want to be sure of their efficacy on brown rust in this location before we change things around too much.

“It's a question of matching variety with



Kevin Bell relies on Neil Harper's and Agrii's expertise regarding his agronomy and overall management and hopes that being an iFarm will play a vital role in helping him to fine-tune his approach.

available markets and then building the right management approach around it. That's the real beauty of the iFarm approach,” he says.

“We can look at all of these factors to produce the best formula for an individual enterprise and then share what we've found, so more local growers can benefit as well as the knowledge gained contributing to the national picture.”



Crusoe, KWS Zyatt and KWS Extase have been grown successfully on farm to date, but there are new options coming through that may be introduced to the system through Agrii iFarm trials.



Agrii agronomist, Neil Harper, has been integral to helping make changes on the farm and provides technical expertise required to aid in making the business profitable.

► he's purchased a larger and heavier 12m roller to help achieve better consolidation and reduce reliance on slug pellets. He's also invested in a new fertiliser spreader with a built-in weigh cell to optimise application. "We don't want to be putting extra money across fields where it's not actually required," he says.

With this in mind, although Kevin applies granular fertiliser, he doesn't want wastage around the edge of the field and so covers the outer 6m with liquid fertiliser instead. "It's these little areas of attention to detail that can help us to maximise returns from every inch of ground."

Benchmarking

The pair also want to determine the baseline organic matter levels in the soil to help set a benchmark to work from in future. "My uncle wasn't into computers, so inputs such as fertiliser weren't drawn up with digital plans, but we now have everything recorded on spreadsheets to allow us to plan," says Kevin.

If they can't make an area of the farm profitable, the next step is to assess the potential for options from the Sustainable Farming Incentive. "We might potentially bring in cover or catch crops with SFI, so this all links together to helping

achieve the maximum from each hectare. But we'll only take land out of production if SFI is cost-effective, and it has to be done in harmony with the business to allow it to be profitable."

Although Kevin has left his career in engineering behind, this hasn't stopped him solving problems on the farm using these skills. One instance is where he designed a reinforced steel plate to fit on the outside wheels of his Horsch Sprinter to prevent it always sustaining punctures.

He's also designed a device to go on the grain bucket to avoid spills and wastage. "When loading from the flat store, because I was a novice, I'd push the bucket into the pile a little too hard causing the grain to spill over the top into the forklift arm, so I created a device a bit like a snow plough so the grain now spills down the sides of the bucket missing the arm entirely."

Part of Kevin's drive to learn and explore the most effective management strategies has been by becoming an Agrii iFarm for the first time in 2023. "This is part of the overall aim to improve profitability and leave the farm in the best condition possible for future generations." ■



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Sustainable Solutions

The leading agronomy development network

Extending from the tip of Cornwall to the Black Isle, north of Inverness, iFarms are part of the country's most comprehensive arable agronomy development network.

Hosted by forward-thinking growers, the network undertakes a range of practical trials and demonstrations overseen by Agrii agronomists in parallel with detailed scientific research delivered by R&D teams at Agrii's six principal Technology Centres.

Each of the 18 main iFarms has its own unique set of conditions, requirements and challenges which are reflected in the trial work undertaken and solutions explored and developed.

The current programme includes fully-replicated national and regional trials as well as field-scale demonstrations with the widest possible range of winter and spring wheat, barley, oats, rye, oilseed rape and maize varieties.

Specific studies are also conducted with a broad range of integrated crop management strategies including pest, disease and weed management, macro and micro-nutrition approaches,



and tillage regimes; cover, companion and alternative cropping options; and a variety of biological, soil improvement and environmental land management opportunities.

A full programme of meetings throughout the year and summer open days give growers the chance to experience the latest iFarm and Technology Centre work first hand — share in their most up-to-date findings while discussing innovative agronomic thinking in thoroughly local contexts. Don't miss opportunities from the network this season — scan the QR code below to explore what's happening where and when, and link to 'invitation-only' events which might be of interest.





“SAP testing is different in that it identifies the nutrition which is available to the plant.”

True nutritional status

Applied Innovation

The eagle eyed among television viewers may have spotted SAP analysis results being scrutinised on a recent episode of *Clarkson's Farm*. CPM looks at why the service has grown in popularity since its inception more than 30 years ago.

By Janine Adamson

Love him or hate him, there's no denying Jeremy Clarkson of *Top Gear* fame has fast become a hit among agriculturalists and the general public alike thanks to his candid account of running Diddly Squat Farm in Chipping Norton.

Through the past three series, viewers have learned just how difficult it can be to make traditional cropping pay, and in more recent episodes, Jeremy has turned to regenerative farming in an attempt to add value.

Part of this involved using SAP analysis to understand the nutritional deficiencies of a regen wheat crop so that applications could be adequately tailored. Diddly Squat aside, Omex Agriculture's Scott Baker says whereas in the past SAP testing has been used to understand poor performance, it's now playing a role in strategic management.

"SAP analysis is essentially a blood test for a plant — it offers a complete overview

of a plant's nutrient uptake while detecting deficiencies and/or excesses before visible symptoms appear.

"Whereas before it was being used to identify the reasons why a crop might not be performing to its potential, we now find SAP testing is being used ahead of key fungicide timings, so that required nutrition can be added into tank mixes for optimum efficiency and output," he explains.

At a very simplistic level, SAP analysis is a means of assuring growers that they're not over or under applying nutritional products, continues Scott.

Plant-available nutrition

"And whereas conventional tissue testing reports the level of nutrients in a sample, it includes those which are locked up or unavailable to the plant. Although any form of testing is valuable, SAP testing is different in that it identifies the nutrition which is available to the plant."

Omex offers this nutritional analysis service by using the purpose-built Scientific Agricultural Partnership (SAP) laboratories in King's Lynn. The labs extract, analyse and interpret sap samples taken from growing plants, using 17 macro and micro nutrient parameters for a complete picture.

Interpretation is conducted by a team of qualified agronomists, allowing individual recommendations to be created for active nutritional management of the crop. Each report indicates the levels of No₃, NH₄, P, K, Mg, S, Ca, Na, Cl, Mn, B, Cu, Fe, Zn, Mo, Al in an easy to interpret bar chart, as well as pH.

Scott says the system has been

developed for decades and continues to evolve as new varieties come to the market and cropping systems evolve. "What this gives us is a wealth of data to tap into; we also analyse samples from Europe which adds further intelligence.

"What we have noticed is that there's been a surge in the use of SAP testing since around 2016, which coincides with regenerative farming becoming of greater interest in the UK. The reason behind that is SAP analysis supports the ethos of producing more from less, while taking proactive steps to decarbonise the food chain," he adds.

"It makes sense — stronger, healthier plants are better positioned to withstand stress and external pest pressure. But it's worth remembering that SAP analysis has a place in any system that wants to be targeted and efficient with its use of inputs." ►



Scott Baker says SAP analysis is a blood test for a plant — offering a complete overview of nutrient uptake while detecting deficiencies and/or excesses before symptoms appear.



**SAP
ANALYSIS**

Omex offers its nutritional analysis service using the purpose-built Scientific Agricultural Partnership (SAP) laboratories in King's Lynn.

► With data in mind, Scott points out that Omex provides monthly snapshot trends based on the findings of SAP analysis. "This has been a challenging season and what we've seen so far is a pattern of deficiencies

Applied innovation

Specialising in complex liquid formulations for use in industries ranging from agriculture to energy, Omex develops, manufactures and supplies liquid fertilisers and crop nutrition solutions.

Also part of the company's portfolio is a full nutritional review service known as SAP analysis. This offers a highly accurate and topical assessment of the true nutritional status of a crop. Crucially, SAP analysis measures only the



levels of crop nutrients available for plant growth.

GPM would like to thank Omex for kindly sponsoring this feature, and for its assistance in providing access to the relevant experts and contacts required to produce it.

in highly mobile nutrients such as sulphur, due to waterlogging and leaching. For growers, this can result in an impact on NUE and quality.

"We know sulphur helps to hold amino acids together which are the building blocks of protein. One market where premiums can be achieved is milling wheat, so correcting sulphur deficiencies will be particularly prevalent to those growers," he explains.

According to Scott, other seasonal trends include deficiencies in micronutrients such as boron in sugar beet crops,

and manganese.

But given SAP analysis is about improving production efficiencies, how does the service stack up? "We believe in making it accessible to all, so it's competitively positioned price-wise. As a benchmark, a tissue test costs around £33," he states.

"The benefit of SAP testing is it helps growers to get ahead with a crop's nutritional requirements, before the symptoms of deficiency are visible, which could have a significant impact on yield and therefore profitability," confirms Scott. ■

Mitigating stress through SAP analysis

SAP analysis was introduced to Albanwise Yorkshire Farms four years ago due to deficiencies in magnesium on the company's chalky soils across the North Yorkshire Wolds, and manganese across the high organic matter land in East Yorkshire.

Will Jones says it's becoming an increasingly essential management tool for the business. "We use SAP analysis to check the nutritional status of crops before a deficiency issue becomes visual, when it's nearly always too late to avoid a degree of yield and quality loss," he explains.

Deficiencies in copper, boron, zinc, and molybdenum are also a common issue across much of the land farmed by the company.

"We only apply essential nutrients when the SAP analysis says there's a deficiency — we send Omex a field map for one of its field staff to come out and take samples two days prior to spraying TO, T1 and T2. Each position is GPS mapped so that when the next sample is taken, it always comes from exactly the same place," says Will.

Analysis is then carried out at the Omex lab with results returned via email within 72 hours. "A three-way discussion then takes place between Omex's national agronomy manager Scott Baker, our independent agronomist and myself," he continues.

Albanwise has its own bulk storage facility for magnesium and manganese, while IBC quantities

of copper, boron, zinc, and molybdenum are also kept on farm.

"We have a very tight window to apply essential nutrition with the T-spray timings. We're using up to 10,000 litres per year of manganese and magnesium, so any delay in spraying by not having the product on site when we require it isn't an option.

"Before SAP analysis, we had to rely on visual crop inspections but of course by then it's too late to rectify a deficiency problem without inevitable yield loss. It becomes a firefighting exercise rather than a preventative action," explains Will.

Although he doesn't use tissue testing, he recognises that many farming businesses do. "Our preference is SAP — we liken it to a blood test in that through your blood a doctor can accurately determine what a particular problem is exactly at that time.

"The problem with tissue testing in my opinion, is, rather like testing skin, the tissue of a plant contains historical information about a problem that might have been present beforehand, but may not be a problem any longer or the damage of that particular deficiency has already occurred," he points out.

But most importantly, crop stress is something that Will is aiming to avoid. "A stressed crop is usually less green for a start so there's less green leaf area to photosynthesise which



Before SAP analysis Will Jones relied on visual crop inspections, but he says by then, it's too late to rectify a deficiency problem without inevitable yield loss.

leads to lower yields.

"I'd add that a stressed crop can be caused by many reasons though, including weather, soils, drought, soil type, temperature, topography and general disease pressure. But, what's certain is that a healthy crop is far better able to deal with any of these issues, in the same way that a human is better able to beat something like a common cold when healthy and fit.

"I'm in no doubt that the future will see more use of SAP analysis and by keeping a crop healthy and in good condition so it can utilise its own immune system, we might be able to reduce our dependency on fungicides," concludes Will.

“ It centres around leaving a legacy to be proud of that’s our starting point. ”

Courteenhall Estate

Originally pursuing a career in medicine, Dr Johnny Wake had to hit the ground running when he was asked to manage Courteenhall Estate 10 years ago. CPM hears how a clear strategy has been key to the business’ successful evolution.

By Janine Adamson

It may prove challenging for some to draw parallels between medicine and agriculture, but according to Courteenhall Estate’s Dr Johnny Wake, it’s more about providing a new perspective on a situation while asking the questions which could otherwise be missed.

He admits at first, he’d planned to remain a medical practitioner while managing the Northampton-based estate, and that he had no plans to undertake the role full time. However, that soon changed. “There were a lot of fires to fight and financial struggles — the business wasn’t very sustainable and it felt as though there was a lot to do.

“Of course there’s no crash course in agriculture; the most I’d known before was helping to cart grain at harvest.

So I signed up to the Institute of Agricultural Management (IAgrM)’s leadership

course which was the trigger point,” explains Johnny.

He says this meant taking a step back to devise a strategy and longer-term vision for the estate’s farming enterprise. “It centres around leaving a legacy to be proud of — that’s our starting point. Then, it focuses on three approaches to sustainability — financial, environmental and community.”

Back in 2013 when Johnny took over, Courteenhall had a narrow rotation based on winter wheat and oilseed rape. The farm’s soils are mostly heavy, Hanslope series clays and blackgrass was becoming an increasingly big problem.

Rotation diversity

“The first steps we took involved widening the rotation to include spring cropping, cover crops and increasing our environmental stewardship — it was primarily with blackgrass management in mind. We also made an early switch to min-till with precision farming techniques to help restore life into our soils.”

At the same time, the farm embarked on a broiler chicken enterprise which according to Johnny, was a steep learning curve for all involved. “The wider benefits are it provides a direct market for our wheat grain while utilising the poultry manures to reduce artificial fertiliser inputs,” he adds.

“The team were mostly on board as we started to implement change — an issue such as blackgrass is very visible and hard to ignore. However, it can be trickier to convince people when it comes to

soil biology.”

A further shift came around two and half years ago when the farm entered into Countryside Stewardship, with half of its fields being down to AB15 (two-year sown legume fallow). The 10-year Higher Tier agreement also involves AB8 (flower-rich margins and plots), AB9 (winter bird food) and WD6 (lowland wood pasture).

Johnny says this is what unlocked the possibility of the estate rearing its own cattle again, which had been missing from the landscape for 30 years. “Where previously we had a contract with a local sheep grazer, we were able to introduce a herd of our own Traditional Herefords which are 100% pasture-based and overwintered.

“But the stewardship scheme also provides a fixed, reliable income while helping to enhance the environment. ►



When Dr Johnny Wake first took over Courteenhall Estate, he says there were a lot of fires to fight and financial struggles.

Leaving a legacy



Courteenhall has now introduced a herd of Traditional Herefords which are 100% pasture-based and overwintered.

► Whereas before our farming system was simplistic in approach, we're now much more diverse," he explains.

Johnny admits that stewardship has helped to offset the arable side of the business, which isn't always profitable, this season especially. But a determination to grow food and look after nature is what drives his journey at Courteenhall.

Furthermore, a consistent part of his focus on sustainability is water. Having previously been 'blissfully ignorant' of farming's wider impact, Johnny says he soon made water management a key priority for the estate.

"We look at water from a dual perspective — resource management and risk mitigation actions. A lot of what Courteenhall does is with water in mind, whether that's precision farming for precise applications, cover cropping to prevent run-off, or implementing a rainwater harvesting system. But we want to do more.

"Farming has the capacity to deliver long-term actions which can help with flood mitigation and protect local communities. Surely this should be a win-win?" he questions. Such aspirations include a proposed whole farm reservoir project, as inspired by the work of Spains Hall Estate in Essex.

Although Johnny acknowledges the work of Courteenhall alone might not have a huge impact in the grand scheme of things, being part of a larger cooperative is a different ball game. "Suddenly by working together, farmers can make a tangible landscape-scale difference, whether that's for water, biodiversity, or beyond," he stresses.

"I came to farming from the outside and one thing that immediately struck me was a lack of collaboration. As a result, I helped to establish the recently launched Central England branch of the EFG (Environmental

Farmers Group), which can help to address this issue (see box). It's about improving how we work together both locally and internationally for environmental and financial gains."

Importantly, Johnny practices what he preaches and has instigated a series of joint ventures with partners across the industry. One such collaboration is in vertical hydroponics – growing medium value crops on columns in polytunnels, on the estate's less productive land.

He also has plans for a joint-venture farm shop and café to add value to the estate's produce through a direct route to market. Johnny hopes this will further strengthen Courteenhall's relationship with the local community — which is a significant part of the estate's strategy which it's already working to deliver.

Because as well as engaging with LEAF's Open Farm Sunday and hosting visits from multiple schools, the estate is home to New Leaf Learning — a charity which offers a nature-based provision for children not in mainstream schools.

A final part of the story so far has been to boost Courteenhall's renewable energy provision. There are now 16 ground source heat pump systems, five air source heat pumps, 8 rooftop solar arrays, two solar-thermal arrays, a biomass system and two wind turbines. Furthermore, planning permission has been granted for an anaerobic digestion plant to work in tandem with the poultry side of the business.

All in all, it's arguable that Courteenhall, which has been under the Wake family's guidance since 1672, has been through a rapid period of change during the past 10 years. But given the chance to rewind, would Johnny do it all again? "I'm often asked if I miss medicine, and I suppose what I do miss, is being fully qualified and trained in a subject. But I love what I do now and really believe in the importance of getting it right," he concludes. ■



Countryside Stewardship provides a fixed, reliable income for the estate while helping to enhance the environment.

Environmental Farmers Group for Central England

A new Environmental Farmers Group (EFG) for Central England has been created, chaired by Dr Johnny Wake of Courteenhall Estate.

The EFG says its mission is to harness scale and member cooperation to secure the best environmental results and financial returns for a range of natural capital goods and services. As a farmer-led cooperative backed by the Game and Wildlife Conservation Trust (GWCT), it provides natural capital investors with a single point of contact and aims to ensure that farmers receive fair rewards.

The newly launched Central England group is EFG's largest cell and includes catchments in Northamptonshire, Leicestershire, Rutland, Lincolnshire, Cambridgeshire, Bedfordshire, Buckinghamshire and Oxfordshire.

According to the EFG, the cooperative acts as a 'trusted navigator' for its members and by joining, farmers have access to information and expertise on the natural capital sector. To receive further information, farmers can fill in an expression of interest form which can be found on the EFG's website.

www.environmentalfarmersgroup.co.uk



The newly launched Central England group is EFG's largest cell and is chaired by Dr Johnny Wake.

“Having connected machines means moving away from reactive maintenance, towards preventative and proactive maintenance.”

Smart tech

Smart technology comes in many forms and so far as machine connectivity goes, it's not just about collecting data, but about improving machine and farm performance across the board. *CPM* checks out some of the connectivity systems on offer.

By Melanie Jenkins

Increasing connectivity in tractors and other farm machines might seem like an added cost, or it could be perceived as an opportunity to improve operations. But one thing is for sure — connectivity is here to stay and it's only going to become more integrated with farm operations.

Below are some of the different connectivity systems produced by key manufacturers, what these offer and how they can be of benefit on farm, as well as a breakdown of some upcoming launches.

Claas

Expanding its digital business is all part of Claas' big picture for the future, explains the firm's Rob Fillingham. "Our vision overall is to enable farmers to be the best in their field and for that to happen we have to embed our digital solutions in everything we do, whether it's on the machine, in sales or the service process."

But why is digital so important? "Connectivity from our point of view can

be a huge time saver, whether it's allowing the customer quick access to their data or making decisions from farm management data."

Claas splits its connectivity system into three aspects: the on board Cemos steering system, telematics and the service system. Data such as service history, warranty and alarm messages can permissively be viewed by a dealership to improve machine maintenance. "We're trying to make connectivity beneficial to everyone in the chain to help manage the performance of machines and improve customer uptime," explains Rob.

In October last year, Claas introduced a five-year machine connect licence as standard for any machine from six-cylinders upwards. "Fundamentally this means having connectivity on the machine, which includes a hardware communication module that sends data to the Cloud.

"One of the key benefits of machine connectivity is it brings the firm's telematics professional licence to all customers with the connectivity licence. In addition, they benefit from remote service whereby dealers can support machines in the field to reduce downtime, and it opens the doorway to send task data wirelessly to the machine," explains Rob. "Claas also has application programme interface (API) partners such as Omnia, meaning task data can be sent straight to its Cemos terminal in its machines."

Going forward, telematics will be built into the firm's new system, Claas Connect, which will be available through a web portal and a mobile app due to go live in October.

Although wireless data transfer could previously be sent through the telematics platform, in future it'll be accessible through Claas Connect. Task data can be sent

wirelessly to the Cemos terminal in the cab and includes elements such as field boundaries and reference lines. "Existing telematics and machine data will be automatically transferred to the Claas Connect portal and customers will be prompted to make the switch," says Rob.

The Claas Connect portal will also provide access to operator manuals and training videos – all serial number specific — as well as machine data and a digital handover process for machine purchases to reduce paper use. There'll also be a tool to manage connections to third party software providers such as Gatekeeper, and access to a Claas parts catalogue and shop.

Machine data will include location, tracks and point data such as yields, says Rob. "But further analyses and interpretations are undertaken through Claas' Farm Connect, Fleet Connect and Field Connect which require additional licences.

"The future aim is for Claas Connect to become an owner's single point of entry to the Claas digital world, providing access to ►



Telematics will be built into Claas' new system, Claas Connect, which will be available through a web portal and a mobile app due to go live in October.

Connecting the dots



Fendt customers can expect to see upgrades later this year with changes to the FendtONE Offboard fields tab.

► all information required to support their machines,” says Rob. “Rolling out Claas Connect is really important as it opens the doorway for autonomy, helping to prepare customers and dealers for technology that’s just around the corner.”

Fendt

FendtOne Offboard portal works with newer generation tractors but also with older S4 tractors with the 25cm NT01 screen, explains the firm’s Peter Henson. “Offboard isn’t limited to brand new tractors but can be used with older ones as well.”

In new tractors, the online Offboard portal is mirrored within the tractor’s display so that users will see tiles for the machine, fields, Map+, a task creator as well as task reports and team members, plus ‘how to’ videos.

Under the machine tile, users can see all Fendt machines as well as other implements. “If machines are on the telemetry, then there’ll be an overview of fuel consumption and working hours which users can click on to see greater detail such as alarms, service history, warranty and documentation,” says Peter.

Live tractor location updates are available and a link to the telemetry website allows users to access further information. Tractors can also be linked to a specific driver and implement information can be recorded in the system manually or through a transfer from the tractor. “The idea is to build a database so as we continue with data capture, there’ll be a standardised naming of implements to aid aspects such as guidance,” explains Peter.

The fields section of Offboard creates a database of the farm in one place where conflicts between data from different tractors can be assessed and updated, and this can then be transferred back to the fleet.

The task creator allows customers to create a task and send this to the tractor, while the reports section displays completed

tasks and all details relating to these in completion order. A failsafe is in place so that if data can’t be wirelessly transferred, operators can do so manually via a USB. “Customers can see when a job was started and completed, where it was done, how much fuel was used, and if the implement has ISOBUS connectivity this data will be available too,” says Peter.

Users can also create heat maps, assess application rates, working width, tyre pressure, wheel and engine speed in the Map+ feature. Information can be imported from and exported to API systems, as well as being downloadable in different file formats for more in-depth analysis.

Customers can expect to see some upgrades later this year with changes to the fields tab to allow for zooming in on fields and the ability to manually draw boundaries. “At present, the boundary is only as good as Google Maps is, so users will soon be able to draw these themselves to help operators work more effectively. We’ll also be implementing the ability to import variable rate maps which can then be transferred to machines.”

In addition, the live tracking feature will be expanded to allow customers to see tractor movements up and down a field as they happen, details Peter. “Fendt will also be introducing a field data converter later in the year so that customers with mixed fleets will be able to import file types from competitor brands via USB.”

John Deere

Connectivity from John Deere comes in the form of JD Link, either through a premium R modem or a standard M modem fitted to a machine, with the former providing machine sync in addition to other shared features, explains the company’s Dennis Schrijver. “JD Link records machine speed, direction of travel and fuel consumption, as well as sending error codes to the dealer to improve operations.”

Updates are pushed through automatically so customers don’t have to do this manually, and according to Dennis, this helps to cut costs. “JD Link also allows for remote access so that with permission, mechanics can view the tractor’s display remotely and talk to the customer to try and fix any issues quicker than having to visit the machine. Because dealers can see error codes before a machine breaks down, they can be proactive — it’s all about support through connectivity.”

And for customers running Gen 4 and Gen 5 displays, data can be wirelessly transferred between machines.



Data on fuel, machine and implement performance as well as history can be accessed through John Deere’s Operations Center.

Via John Deere’s Operations Center, customers can see the live location of machines as well as monitoring their idle or in use time. “This is especially useful for bigger fleets as it helps to determine driver efficiency and which machines are most expensive to run,” says Dennis.

Both John Deere and other manufacturers’ machines with a JD Link modem can be added to the Operations Center, where fuel performance and history can be accessed and customers can dive deeper into data to assess machine and implement performance, he explains. “Contractors can utilise this not just for their own use but also to prove to a customer that a field has been worked.”

Data can be exported to a PDF or Excel file, and can be sent to or from connected API software. “This allows users to send machine performance data to their farm management software if they wish,” adds Dennis.

The portal can also be used to provide directions to a machine or field, either for ►



Connectivity from John Deere comes in the form of JD Link, either through a premium R modem or a standard M modem fitted to a machine.

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From the end of June, there'll be big changes for New Holland's connectivity system as it moves over to a new combined web portal and app under the FieldsOps heading.

► other drivers or for mechanics, making it easier to find machines when they're away from the main farmyard, explains Dennis. "It's also possible to set maintenance plans to streamline services with dealerships but this is all only accessible with permission from the owner."

Field analyser allows customers to view field size and boundaries, as well as record work which has been carried out in that field, such as tillage, spray applications and even moisture and yield records at harvest.

Most of the accessibility of the web portal is also available via a mobile app however, although the functionality is the same there's a little less analysis available,

highlights Dennis.

"Connectivity is allowing customers to get more out of their products while optimising fleet management," he says. "It's about saving time and money, as well as receiving active support when it's required and being proactive with machine maintenance to improve uptime."

New Holland

For New Holland there are two aspects to its connectivity system; what it includes and who it's benefitting, says the firm's Tom Mead. "Our end goal with connectivity is for it to benefit end users by improving interactions between customers and the dealer to reduce downtime and increase uptime."

"Having connected machines means moving away from reactive maintenance, towards preventative and proactive maintenance," he points out. "The initial benefit for the dealers is that it reduces visits by the mechanic as the sensors and telematics can be accessed through remote access and screen sharing. And when the mechanic does attend the machine, they'll know exactly what has to be done and can take the relevant parts."

"Farmers are also becoming increasingly busy; working in smaller weather windows

and machines are becoming more expensive and more relied upon. So if a machine is sat idle for hours during prime moving hours, there's potential for improvement, but without connectivity you might not know this."

Through the MyNewHolland and MyPLMConnect (Precision Land Management) portals users have been able to add and monitor their machinery, download operator manuals, access online support and training, assess productivity and performance and evaluate agronomic and farm information.

But from the end of June, there'll be some big changes for the system as it moves over to a new combined web portal and app under the FieldsOps heading. "This will bring with it all the core functions of the previous iteration, with access to all machines, telematics, parameters, error reporting, history and fleet management but streamlines this for a better end user experience," says Tom. "Users won't have to transfer any data but will just have to log in to the new system, and will be able to continue using the old portal for some months during a transfer phase."

Features such as live machine tracking will be updated so that instead of data being



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pushed through every 10-20 seconds, users will be able to monitor machines on a second-by-second basis, he adds.

Customers will also be able to integrate their farm management software in FieldOps so their data is all in one place. "This'll allow users to seamlessly send agronomic data to and from machines while jobs can be assessed and analysed via the portal — it'll also provide a gateway for farmers to introduce variable rate maps."

New Holland is also trying to push for greater API links to improve data transfer between platforms, says Tom. "We're keen to see more integration with agronomists' data to improve the transition of information to farm and vice versa."

At present, any New Holland machine from the T5 up comes fully connected with a five-year licence, but for any machine (New Holland or otherwise) a CM1X modem can be purchased and retrofitted to provide connectivity via New Holland's portal.

While New Holland currently runs a subscription plan for its connectivity service, this will soon be a thing of the past as the firm has seen the widespread benefits of the system for its customers, its dealerships and for itself, says Tom. "Machines will soon be delivered with a lifetime connection because the uptake has been so successful and positive."

Valtra

Although AGCO has a common system across its brands, Valtra was the first to release Connect on its machines at LAMMA in 2019. So what's Connect capable of and how can customers get the most from it?

The system consists of web and mobile apps that allow users to see where their fleet is, so activity can be monitored in real time, explains Valtra's Andrew Humphry. "Using Connect, it's possible to see when tractors require refuelling, their fuel efficiency, working hours, idle and down time as well as comparing them with other machines in the fleet."

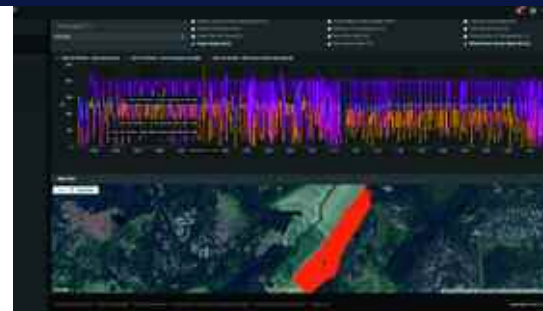
The system can also be used to provide proof of work whereas the live location capability offers peace of mind when operators are working remotely, says Andrew. "It also has a curfew function, so if tractors are moving outside of their set operating hours, an alarm will go off on the owner's phone via the Connect app. Alerts can also be set for fields or specific boundaries but it's important to note that this isn't a security feature, but instead a tool for the owner's management."

Connect also helps to streamline and improve dealer support as the dealership can digitally see when a tractor will require a

service and book it in with the customer, rather than the customer having to keep track, he adds. "And because machines are becoming increasingly technical, it's important to keep software updated via a technician."

Dealers are also able to receive alerts for issues such as low oil pressure, and if this isn't actioned, the dealer can proactively contact the customer to organise fixing the problem to help prevent greater costs down the line, says Andrew. "This is all about building the relationship between the dealership and the customer and to create a more streamlined system."

Connect was first launched on the N and T series tractors but is now on the G, Q and S series, furthermore, any of these models can be retrofitted with the modem and display to enable connectivity if they didn't



Valtra Connect makes it possible to see when tractors require refuelling, their fuel efficiency, working hours, idle and down time as well as comparing them with other machines in the fleet.

have it pre-installed, he says. "Valtra is working towards making Connect standard across the lower horsepower tractors it produces as the technology becomes more popular." ■

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Who's got the power?

Material handlers

One of the most useful and versatile pieces of kit on farm, the telescopic handler does the jobs nothing else can, but what about if it's electrically powered? *CPM* explores what battery power has to offer.

By Melanie Jenkins

As the drive to switch to alternative fuels continues, a number of manufacturers have ventured into the realms of electric telescopic handlers with various concept and commercial machines now on offer.

While an electric telehandler might not be every farm's first choice, the market has continued to expand slowly with new concept machines from both Claas and Merlo launched at Agritechnica last November, an incoming commercial

machine from Manitou, and continued production by JCB and Faresin.

Claas

Venturing into the electric telehandler market, Claas has revealed a fully electric version of its Scorpion. Showcased at Agritechnica 2023, the Scorpion 732e boasts almost 7m in boom height with a total lift capacity of 3.2t, offers a maximum power of 53kW and has a top speed of 30km/h.

The machine has two 90kW (121hp) electric motors developed in conjunction with Liebherr — one for drive and the other for hydraulic power. A 64kW battery pack provides a maximum of four hours work and has a 22kW charger.

The firm believes battery-electric telehandlers are capable of fitting into the lower performance range sector for use in material handling, yard work and municipal use. According to Claas, the battery can be charged using electricity generated from an on-farm PV system or biogas plant, as well as via mains chargers.

Faresin

Although seen less frequently on UK farms than other manufacturers, Faresin has also produced a fully electric telehandler. The firm has both a small and large range of electric machines with the smaller series capable of lifting up to 2.6t with a maximum boom height of 5.6m. However,

“It felt like an expensive purchase initially but the grabs have stood the test of time.”

the large range can lift 4.2-4.5t and has booms ranging from 13.6m up to 16.4m.

Distributed in the UK by GGR Group, the largest 17.45 model features a 45kWh battery and offers a run time of up to eight hours for non-intensive use and up to 3.5 hours intensive use. It includes an onboard charger as standard, capable of producing 0-80% charge in four hours and 0-100% charge in six hours.

It also has a universal charging socket identical to the type used on motor vehicles, which features intelligent charging to ensure the machines can be charged with whatever power source is available on site, including single or three-phase options.

JCB

Although JCB has turned its attention

Originally launched in October 2021, Merlo's e-Worker 25.5-90 with 4WD produces 90hp and has the capacity to work for eight hours without recharging.

more towards hydrogen power, it also launched an electric telehandler in 2021. JCB's 525-60E compact telehandler is part of the firm's 100% electric E-Tech range, with zero emissions and less noise than its diesel counterparts.

Although not designed specifically for agriculture, the machine has a 6m lift height and 3.5m reach, a maximum of 2.5t lift capacity or 2t at full height, and can travel at speeds of up to 15km/h.

A 24kWh lithium-ion battery weighs in at 340kg and can power the machine for up to 3.5 hours. A 17kW motor provides drive for traction while a second 22kW motor runs the hydraulics.

It can be powered up using 110v, 230v and 415v connections and is fast charge ready, taking eight hours to reach 100% with the 3kW on-board kit (240V) or 110 minutes with 18kW rapid-charging kit (415V) connected to three-phase power supply.

The machine has constant 4WD and three steering modes, is compact in size at 1.89m in height and 1.84m wide, and weighs 5.2t.

Manitou

Winning a bronze medal at Lamma 2024 in the IAgRE Best Environmental Award, Manitou's MLT 625e is the firm's first agricultural electric telehandler, which is based on the diesel MLT 625.

The prototype of the machine on display at Lamma back in January had a 6m reach and 2.5t lift capacity and is fully electric with two electric motors — one (14kW) to replace the hydrostatic drive of the diesel version, and the other (25kW) for the hydraulic system.

Power is delivered via a 25kWh mid-set lithium-ion battery which can deliver up to four hours of constant use. The machine includes an on-board integrated (9kW) charger, meaning that the battery can be recharged at any point able to connect to a Type 2 EV charger. It also comes with adapter plugs to suit different points.

On a three-phase 380v power supply the charging time to 100% takes around three hours, but lower power supplies will take longer.

The dashboard and in-cab electrical system has had an upgrade from the diesel version, including expected run time and battery levels. ►



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Material handlers



JCB's 525-60E compact telehandler is part of the firm's 100% electric E-Tech range, with zero emissions and less noise than its diesel counterparts.

► According to Manitou, the benefits of the machine are that it's zero emission, low noise and reduce maintenance.

But customers won't be able to get their hands on it just yet. Despite a construction version being previewed last year, production of the electric version isn't expected to begin until later this year.

Merlo

Originally launched in October 2021, Merlo's e-Worker 25.5-90 with 4WD produces 90hp, has the capacity to work for eight hours without recharging and can lift to 5m with a total load capacity of 2.5t at 1.5t maximum lift height.

The machine has 24 48v batteries weighing 400kg which can be recharged with a three-phase power supply, taking around nine hours to reach full capacity.

At just 1.5m wide and under 2m in height, it's a highly compact machine but includes a full-sized cab with a split door. It includes a capacitive joystick, has a clevis hitch and is rear-wheel steer.

Fast-forward to Agritechnica 2023 and the firm showcased a full-size electric concept targeted at agriculture. Although at this point it's not a production machine, the concept TF43.7 has a six-hour run time, a 7m boom and a 4.3t lift capacity, offering similar performance to the firm's TF42.7 diesel machine. While the e-Worker runs on lead acid batteries, Merlo has switched to lithium-ion in the TF43.7 with a Type 2 charger. ■



Manitou's MLT 625e is the firm's first agricultural electric telehandler and is based on the diesel MLT 625.

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Grabbing attention

No telescopic handler is complete without the correct and safe implements to be able to operate effectively — aspects which Aaron Hughes, manager at Roger Davies Contractors, Eaton Constantine in Shropshire, takes very seriously.

A hay and straw merchant, the firm runs four balers, two of which are Fendt high density and three JCB telescopic loaders which move at least 32,000 bales of straw per year, as well as a lot of hay bales, explains Aaron. "Historically we've built our own bale grabs, which may have been over-engineered to be very strong and heavy, to avoid them breaking due to many different people operating them."

Although having large sheds to house the straw, the prongs which had been designed to hold onto the bales would hit the tops of the shed when bales were being stacked, meaning Aaron had concerns. "When travelling on the road, despite the spikes being lowered, I still had concerns about the safety of the grab especially as we have five different full-time members of staff and multiple students at harvest."

Another issue that arose with the farm grab was that bales would shift about as the loaders

travelled across a field, especially when going over tramlines or bumps, he adds.

So around five years ago when he came across MX grabs at an arable event, he decided to invest and now has three on site including two Manubal V7000 models. "Initially I was concerned that the MX grab wouldn't be strong enough to do what we required of it because it's a lot lighter than the grabs we'd made previously. But I've been really impressed, not just the quality of the steel used but also the build quality — it has strength in all the right places."

Aaron also likes the set-up of the MX grabs in that bales can now be stacked without catching the roof of the shed, and that it provides the capability of stacking the bales on their edge on the lorries for much faster loading.

A further aspect that's been well received is the multiple spike set up, which means bales no longer move around on bumpy terrain because of the tines down the back of the grab. "With bales coming in at around 525kg each, and the grab capable of holding four at once, it's lifting up to 2100kg in one go and these aren't moving around at all," he explains. "The grab also folds in the tines for road transport which



Having invested in several MX grabs, Aaron Hughes has been impressed with the strength, build quality and the performance.

has removed my safety fears and everyone is now happier with the set up."

Additionally, he notes that the previous grab had a large nut on the back of each tine which would require tightening daily, but on the MX grabs the tine holder has pins which don't require tightening, making it easier to remove or replace the tines.

"It felt like an expensive purchase initially but the grabs have stood the test of time and I now feel they're money well spent. I've been really pleased with the quality, wear and even the paintwork," he adds.



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On Farm Opinion

Thirty-year allegiance

For one Suffolk farm business, broadening its land base and the variety of crops it grows has placed greater demand on many input factors including its materials handling requirements. CPM learns how its choice of brand has stayed unchanged for three decades.

By Martin Rickatson

When Geoff Mayhew purchased his first Merlo telehandler in 1995, the marque was still relatively unknown in the UK — the Italian manufacturer had founded its UK subsidiary just two years previously. However, an active local dealer plus design features such as a low-mounted boom pivot, consequent all-round vision and hydrostatic transmission, were the key points which persuaded Geoff to change brands.

Today, with the expansion of its operations through contract farming and FBT (farm business tenancy) opportunities, Geoffrey Mayhew Farms has grown to manage 810ha of cropping

ranging from cereals and potatoes to sugar beet and parsley.

Despite this, the business' machinery fleet is relatively modest with a hired combine, two main tractors in the 200-300hp bracket and a trailed beet harvester. But with a spread of land and farm bases, plus the diversity of crops, its telehandler fleet has tripled, yet Geoff's chosen make remains unchanged.

Shotley peninsula

An arable-only operation, Geoffrey Mayhew Farms covers mostly light sandy loam soils on and around the Shotley peninsula, south of Ipswich. In addition to winter milling wheat, winter malting barley and winter beans, cropping includes 80-100ha potatoes, 130-140ha sugar beet on a 10,000t contract, and 75ha parsley for processing by a local business.

"Adding in an equestrian business we've recently invested in, that means there's a large handling workload moving grain, potato boxes and beet, plus the other tasks such as building maintenance," says Geoff.

"We've reduced the potato area a little, but I'm now looking to build it back up after signing a marketing agreement with East Suffolk Produce which gives us excellent multi-outlet opportunities and should provide a little more stability.

"In terms of the beet, we use a contractor for drilling but lift around 80% of the crop ourselves with a six-row trailed

“I'm not a fan of making a big change for the sake of a small discount offered by a dealer trying to get me to move to their make of machine.”

Garford V6 Hydro. I purchased the harvester a couple of years ago on the basis that we have the staff and tractors and trailers, so may as well make full use of them in the quieter winter months," explains Geoff.

He says it's a very simple system and with the tractor and harvester combination being much lighter than a self-propelled, he can choose when to lift and travel without causing excessive damage. "Even in the past wet season we still lifted around 100ha of our own with a contractor to help just at the beginning and end when we were busy with other tasks.

"On our light sandy loam we don't tend to require too much dirt separation, and by the time it goes through a self-propelled cleaner loader it's clean enough for loading, with dirt tares below the factory average. ►



Staying with the same make of handler negates having to change existing attachments or the machine's headstock.

► "But I don't make a point of owning all of our major equipment. I prefer to adapt machinery investment to the situation so, for example, we contract-hire our New Holland CR9080 combine from APH," he continues.

"Machinery is all about service and back-up, and I know it'll have been serviced and maintained properly ahead of each harvest and I don't have a depreciating asset in the shed. Having the latest technology is nice but it comes at a significant cost, and the machine we hire has all we require."

The business' tractor fleet is operated on a different basis though, with three major manufacturers and four brands represented.

"We've scaled back from a Challenger crawler, replacing it with a Fendt 828

wheeled tractor with VarioGrip tyre inflation system for tillage and drilling," explains Geoff.

"The crawler did a job in terms of helping us to restructure the land as we moved towards minimum and no-till, but tyre technology has moved on and the 828 is a lot more flexible and convenient. It's supported by a John Deere 6250R which is equally as capable on lugging work but is switched to narrow wheels ready for irrigation tasks when necessary.

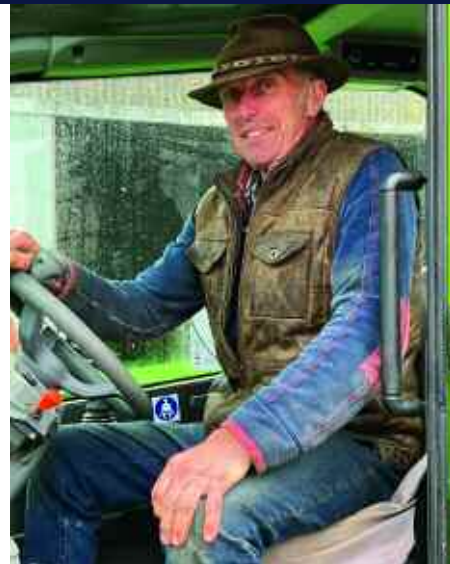
Considered purchases

we also run a Valtra N Series and a couple of older Deutz-Fahr Agrotions, and contract hire a small, flexible, light-footed John Deere 6130R which is on dual narrow wheels all round to pull the beet harvester. With only 150hp, we can lift a sensible tonnage of beet each day; I wanted to prove that we could do our own beet with just this much power and investment," he says.

According to Geoff, with a wide spread of crops the farm's 36m John Deere R4040i sprayer has its work cut out, particularly as it's also used for liquid fertiliser.

"The windows of opportunity to get jobs done have been really tight in recent months and this is exacerbated by the fact we're close to the coast," he points out.

"A reliable sprayer is crucial to our operations, particularly with the varied products and spraying intervals required by the parsley, beet and potatoes as well as the combinable crops, and then the liquid nitrogen on top which by its nature is high volume work."



According to Geoff Mayhew, some of the farm's most demanding work is when the team is working with potato boxes.

But while the liquid fertiliser work takes some load off the telehandler fleet, seed and crop handling keeps the Merlos busy almost all year round.

"Possibly some of the most demanding work is when we're working with potato boxes," says Geoff. "This is where an efficient infinitely-variable transmission that doesn't suffer from the lumpy movement that afflicts some telehandler transmissions is so important for safe stacking at height and manoeuvring boxes.

"We found year on year that the Mrlo transmission, plus the boom suspension, gives us exactly that."

Powered by a Perkins 3.6-litre engine producing 136hp, the transmission fitted to Geoff's newest Merlo telehandler, a Turbofarmer 38.10, stays true to Merlo's hydrostatic hallmark being a twin-range unit with maximum 40km/hr travel speed.

Further specification can include cab suspension, boom suspension and Merlo's CVTronic transmission, which comprises two hydrostatic motors with axial pistons driven by an electronically controlled hydraulic pump.

At low work speeds they function in conjunction to provide maximum torque with an increase of 12% above that of conventional hydrostatic transmissions. During transport, the second hydrostatic motor is automatically disengaged from the control system and the oil from the pump powers the main hydrostatic motor that enables the machine to reach its maximum 40km/hr travel speed.

"Even when we first ran Merlo telehandlers in 1995 the transmissions were so much better than those of any of



Merlo's infinitely-variable hydrostatic transmission provides the smooth response necessary for delicate loading tasks, says Geoff Mayhew.

the competition and is a key reason why we've stuck with them," comments Geoff.

"When you have something that works, even though all of the alternatives are improving it doesn't make sense to change. We're used to the machines and the prices are pretty similar, so then it's down to dealer relationship and the service and support they provide.

"We stayed with Merlo when the franchise switched from an independent dealership to a new start-up Marst Agri, which was founded by some of the service engineers from that former dealer. They know the machines and were on the ball when we were looking recently for a new one," he says.

With the latest purchase, Geoff chose to not trade in an existing machine, instead transferring one of the older 2011 handlers in his three-strong fleet to the equestrian business he's developing, while another is mostly permanently sited on an outlying contract farm.

"I'm not a fan of making a big change for the sake of a small discount offered by a dealer trying to get me to move to their make of machine, so it takes something serious to make me consider another

brand. The new 38.10, which is our first new telehandler for a while — we bought our last machine second-hand in 2011 — has settled in well since its arrival in March.

Operator familiarity

"Staying with the same brand, of course, also means we don't have to change our existing attachments or the machine's headstock, and at the same time it helps with operator familiarity. We have four full-time staff and they like the Merlo machines — that familiarity means they know how to operate and get the best from them," explains Geoff.

"There's perhaps more technology on the latest machines than an occasional operator will use, but the fundamental Merlo traits such as transmission smoothness remain, and the telehandler-qualified casual operators we can have during the busier months can jump on and drive these machines with ease," he adds.

A key attraction of the new machine, which his dealer had in stock and is the first handler he's bought new from him, is that at 10m, it has 3m more lift height than his former main machine.



Operator familiarity with the Merlo design and controls means the Mayhew team, including casual staff, know how to get the best from the machines.

"I've sacrificed a little maximum capacity, at 3.8t versus 4.0t on my Turbofarmer 40.7, but the additional reach is really useful on box and grain store work and for reaching out over the drill when filling.

"We've recently moved from a Lemken Solitair cultivator drill to a 4m Mzuri Pro-Til, our first direct drill, as I've taken advantage of the FETF grant and wanted ▶

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With a diverse farming portfolio including combinable and root crops and an equestrian enterprise, the farm has retained older Merlo models for lighter uses.

► to minimise crop establishment time on short weather windows.

"It's been a challenging first season but

although some of the wheats seemed to struggle a bit at first, the barleys drilled straight behind sugar beet were looking very good by late spring despite the difficult winter," continues Geoff.

Manoeuvrability

"The Merlos do all of the seed handling and carting and pull and handle well on the road. A nice compact design makes a big difference here in terms of vision and manoeuvrability. While our nitrogen is mostly liquid, there's also some bagged fertiliser to cart and transfer," he says.

The Merlo ASCS system, which adjusts the speed and maximum extend of boom movements based on attachment, load and load position, also comes in for praise.

"Another of the tasks which we use the new machine for is building maintenance,

working with an approved safety cage. Features such as this help to ensure staff safety as well as prove our safety commitment for insurance and inspection purposes."

In terms of design criticisms, Geoff's chief one is typical of that levelled at many agricultural machines.

"There's nowhere to put a toolbox, but that's a pretty minor gripe as things go. What I'm most concerned about is how a machine stands the test of time — we give our handlers a hard time, but past experience has shown me Merlo machines can cope.

"Service-wise, with the dealer back-up we receive I'm assured by the fact they know exactly what the handlers' regular service requirements are and they're here promptly to conduct them. It's tough for smaller independent dealers, but I champion them," he says.

Geoff points out that he didn't look at other machines when it came to purchasing this latest handler, as he believes some decisions are personal and simple to make if there's trust in a dealer and the products they support.

"If I instinctively see that I'm receiving the best back-up I can, I'll actively seek the advice of that dealer over the right thing to buy. Others may be keen to bring me their machines to try, but I already know I have a robust machine that does what it has to do, so I don't really have the time or reason to look at alternatives.

"I don't require anything that's physically bigger. Even this 10m machine offers the compact dimensions I want for moving around my yards, and the visibility I require for precise loading and for safety, which has been part of Merlo's design principles since we had our first Merlo Panoramic.

"Competitors' machines have undeniably caught up, but I see no reason to change," concludes Geoff. ■

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Drone application development

Applying plant protection products using drones is a step closer to reality now a trials permit has been issued for slug pellets.

The decision by the Chemicals Regulation Division (CRD) to grant an extrapolated trials permit (ETP) paves the way for an Extension of Authorisation for Minor Use (EAMU), which could lead to the first commercial application of a pesticide to food or feed crops in the UK by drone.

The development is off the back of two years of work by Staffordshire-based technology company AutoSpray Systems, which first identified a market for heavy lift drones in UK agriculture in 2019. That autumn, similar to recent months, prolonged rain prevented growers from accessing land to drill seed or apply products such as slug pellets or pre-emergence herbicides.

The company's co-founder Andy Sproson says Civil Aviation Authority (CAA) regulations haven't explicitly excluded aerial application from unmanned aerial vehicles (UAVs) for some time. However, use must be justified and to do this, AutoSpray systems produced a risk assessment which was submitted to the CAA and the case was accepted in December 2022.

He says another missing piece of the puzzle was a pesticide regulatory framework with the data to show how the product behaves when applied from UAVs.

"Firstly, we had to prove our competency to the CAA. Thankfully, we were able to do so as the company has CAA Recognised Assessment Entity status. We also had to outline the benefits of using drones in this way," he explains.

Andy says these include application to land when ground machinery would damage crops and/or soil structure, cause compaction and increase run-off/pollution risk.

"Drones can also be used to target applications when a blanket approach isn't appropriate, or

larger machinery isn't as efficient, such as when spraying off patches of grassweeds. We also required the backing of an existing product authorisation holder, and now have this with Certis Belchim which distributes SluXX HP ferric phosphate slug pellets in the UK," he adds.

With the ETP granted, AutoSpray Systems and Certis Belchim will now conduct ballistics testing to demonstrate to regulators that the spreadability of SluXX HP is as good as what can be achieved using conventional applicators.

Once this data is submitted to CRD, it's hoped an EAMU will be granted and growers with access to a large payload drone — like the XAG P100 Pro imported by AutoSpray Systems — will be able to apply SluXX HP slug pellets from the air.

In work undertaken last year, the XAG agricultural drone broadcast cover crop seed into standing cereals at speeds of 30-35kph. Furthermore, work rates of 15-20ha/hr is possible with one drone, multiple batteries, a generator, and fast charger. The same will apply to slug pelleting.

"It's the first time a new application method has been made available to growers for many years and offers an option which compliments conventional machinery," highlights Andy.

He added that AutoSpray Systems has already worked with HSE-CRD and Silsoe Spray Applications Unit to gather spray drift data to show liquid products can be applied safely and effectively with its drones.

This sets up the possibility of further collaboration between the firm and agrochemical manufacturers, which could soon facilitate spraying of pre-emergence herbicides or late blight fungicides from the air with an unmanned aerial system (UAS).

CPM recently featured an in-depth article on drones in its April issue with insight from ABZ Innovation and Drone Ag (see pages 84-86).



Having invested in several MX grabs, Aaron Hughes has been impressed with the strength, build quality and the performance.



An extrapolated trials permit has been issued for the application of slug pellets via drone.



Ballistics testing is taking place to demonstrate that the spreadability of SluXX HP is as good as what can be achieved using conventional applicators.



talkingtaties

by Andrew Wilson

The challenges continue

As seasons go, spring 2024 must be one of the most frustrating that I've experienced in 30 years of farming. It's tested everything — from kit to people to resolve, and everything in between. But we've made it, somehow!

To say sowing has been protracted is an understatement — field state has dictated planting order more than anything and having several drills has certainly paid off. We sowed the spring beans in the third week of April, which in all honesty, currently look superb.

Spring barley, however, is a different story. We strip-tilled the first Laureate into a levelled potato field on 17 April and placed some fertiliser under it — this looks excellent. The rest is a mixed bag varying from okay to 'why did we bother'. Some of it replaced second wheat on heavy land and was scratched with a spring tine and sown on 9 May, which is two months later than our standard average drilling date.

The first drilled of our spring oats also followed potatoes in late April, with the last almost

direct drilled on 13 May — the latest ever by quite a margin. I've taken the view that prices are heading in the right direction and if these moderate spring cereals pay the rent and leave us a bit of much-needed straw, then that's as much as we can expect.

Root crops haven't been a walk in the park but finally they're planted. We managed to sow the pollinator strips in the sugar beet fields in between drilling barley, and finally established the beet by 10 May, all of it with some encouragement placed under the seed. It's seemingly leapt out of the ground and is currently looking promising.

Speaking of beet, I managed to attend the BBRO's BeetField event held not too far away at Selby recently, the furthest north it's ever been by nearly a hundred miles. I urge all beet growers to attend these events; the knowledge transfer possibilities are endless and there's always something to learn.

We're generally quite relaxed about potato planting here. Historically our best performing crops are planted in May and emerge in a fortnight, so a late start didn't seem a big drama a month ago... then more rain happened!

We had 18 days of action and 12 of no planting to get 60ha of potatoes in this year. But, with a lot of frustration with silly breakdowns and a member of staff leaving us due to a change in personal circumstances (we have a vacancy if anyone is looking for a job with plenty of variety?).

At the time of writing, I have

around half of our pre-emergence herbicides applied and although the diff lock had plenty of exercise applying them, at least there's no shortage of moisture to activate them.

From a more positive perspective, we managed to harvest the last of 2023's potatoes on 4 May and chitting seed looks once again to be worthwhile, with a full two weeks' less time required from planting to emergence. This will make a significant difference to crop maturity and our harvesting schedule given the indeterminate varieties involved.

On the machinery front, we've also had a glimpse of the future when we hosted a demo of a robotic tractor. I'm sure they have a place in UK agriculture in specific circumstances, but the effect of urbanisation will make it nearly impossible for them to replace the average harvest student.

Exercising regenerative farming measures in a challenging season isn't easy, but we seem to be making progress. Bed tilling sits once again at about a quarter of the area, which is less than I expected. We're seeing the fruits of 13 years of cover cropping and strategic variety positioning, and for the first time in as long as I can remember, we've not used any nematicides at all this season.

These two items strike me as the most significant to reduce, from an energy, EiQ and soil sympathy point of view. I look forward to visiting some trial sites over the summer to pick up a few more tips for the future.

Our winter cereals are a mixed bag varying from 'four tonne

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

potential' to a blackgrass infested patchwork of mediocrity, but are romping through growth stages quickly. Add to that prices which are heading in the right direction and fertiliser at least starting the season under a £1/kg of N, it's not all bad.

Harvest is apparently only a few weeks away but the combine is serviced, the baler has had some exercise with some hay, and the trailers are in a thousand pieces in the workshop, getting ready for hauling what will be an interesting harvest, I am sure.



To say sowing has been protracted is an understatement.

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Alternative approaches to sugar beet

Nitrogen nuances

In the second of a two-part series investigating new techniques or technologies to improve sugar beet growing, *CPM* looks at trials seeking to improve agronomic practice.

By Mike Abram

There's no escaping the fact nitrogen fertiliser is one of the biggest sources of greenhouse gas emissions from growing sugar beet on farm – just as it is with other arable crops. In fact, according to ADAS calculations for a British Sugar commissioned report, emissions from fertilisers are the second biggest source at 17%.

Only machinery accounts for more at 24%, so meeting net zero targets is almost certainly going to require changes in the way farmers use nitrogen, whether that's the techniques used to apply it, the way it's made, or the types of products used.

Equally, nitrogen drives growth, helping to achieve a healthy canopy as quickly as possible to maximise light interception and yield in the crop.

Consequently, understanding the impact of different application techniques or types of products on the growth and yield of a sugar beet crop, as well as emissions, are the key aims of new BBRO research which started this spring.

The project has two strands, explains BBRO applied crop scientist, Dr Georgina

Barratt. "One looks at the placement of fertiliser, the other investigates the different products coming onto the market, including some which are slow-release."

While fertiliser placement isn't particularly new with some of the largest drilling contractors using it with success, there's a lack of data backing up anecdotal reports of enabling lower fertiliser use, she continues.

"We don't have enough data to back up that you could make savings," says Georgina. "That's preventing more growers from having the confidence to fit placement kits to their drills."

Optimum dose

Previous work in 2018 focused on discovering the optimum dose to place at drilling, which proved to be around 30-40kgN/ha. But this year's trial on a farm just outside Bury St Edmunds in Suffolk is looking at whether the total dose of nitrogen can be reduced when using placement fertiliser for either part or all of what's applied.

In total, there are five treatments covering around 8ha in 6m-wide 100m-long field-scale plots. Three treatments involve an initial placement of 30kgN/ha of liquid nitrogen at drilling, which have then been topped up with either nothing, 35kgN/ha or 70kgN/ha of broadcast solid urea to make totals of 30, 65 and 100kgN/ha.

"Obviously you wouldn't not top up on farm, but from a scientific perspective, we want to know where just placing 30kgN/ha gets you to and then how much you have to follow up with," says Georgina.

Alongside those three treatments is one where the entire dose of 97.5kgN/ha is placed at drilling. "We've spoken to Nordic Beet Research and learned they place all of

“ There's an assumption that these products might require managing differently, but we don't know yet ”

their fertiliser, so this was another test."

The final comparison is the control treatment of 30kgN/ha of broadcast ammonium nitrate at drilling followed by 70kgN/ha of broadcast solid urea to match the current farm standard. ►



While fertiliser placement isn't new, there's a lack of data backing up anecdotal reports of enabling lower fertiliser use, says Dr Georgina Barratt.

Alternative approaches to sugar beet



Understanding the impact of different application techniques or types of products on a sugar beet crop are the aims of new BBRO research.

► Weekly assessments of canopy growth and health using NDVI imagery, canopy temperature and cover will follow establishment counts for each treatment, before three sets of biomass digs through the season.

"The first two digs at six and 12 true leaves will look at nitrogen use efficiency as well as speed of canopy development, and then just before harvest, a yield dig, which will also go through a tare house to look at impurity data as well as sugars," explains Georgina.

She says that's important because

impurities are a problem for both growers and processors – suppressing yield and requiring costly removal in the beet factory. In particular, late season nitrogen uptake can drive increases in impurities, which is why there's a requirement to trial new forms of fertiliser, because some have a slow-release mechanism which could potentially mitigate that drawback.

Low carbon approaches

And that's what's been tested in a second trial — this time at two sites in a 6m by 10m replicated plot design rather than the tramline style plots of the placement trial.

"The other question we had was around the lower carbon fertilisers currently available and whether they work for sugar beet," continues Georgina. "While you have Yara green fertilisers, which are ammonium nitrate made with renewable energy sources and will perform similarly to normal AN, you also have some organic matter-based fertilisers."

Both Yara and CCM Technologies, for example, produce organo-mineral fertiliser products, which look a little like pulp nuts, she explains.

In the BBRO trials, these are being tested

against ammonium nitrate and urea. Each treatment is applied in two applications — 60kgN/ha at drilling and another 40kgN/ha in early May, while there are also lower dose treatments of 50kgN/ha – all applied at drilling — of AN and zero applied fertiliser, lists Georgina.

Similar assessments as in the placement trial are planned, plus greenhouse emissions in the field. "Initially, the overall idea is to see how they perform in a standard programme. There's an assumption that these products might require managing differently, but we don't know yet. I thought the pellets might take forever to break down, but they actually disappeared in a couple of days, obviously with the rain helping."

It could be they're better applied pre-cultivation or pre-drilling, notes Stephen Aldis, BBRO's head of field operations. "That would give a level of incorporation which might be better in a dry spring. They might also work better all being applied pre-drilling so there are lots of learnings to come."

That kind of further research is planned for following years in the project, along with other combinations in the placement trials such as testing placed dry fertiliser as well as liquid, he adds. ■

Alternative weed control trial

The loss of herbicide active ingredients along with social pressure for more sustainable weed control practices, has led British Sugar to set up a trial at Yaxley in Suffolk investigating whether alternative weed control techniques are viable options.

There are a number of reasons to look at alternatives, including revisiting practices such as mechanical weed control, says British Sugar technical support manager, Pam Chambers. Other reasons include increasing resistance to remaining herbicide actives and the potential loss of triflurosulfuron-methyl, which is in its last year of use in Europe.

"I think we, as British Sugar, must be careful that our customers don't think tractor hoeing or some other techniques are 'greener' than they actually are. Research in Germany has found that alternatives have their issues as well."

In future years, Pam hopes that will mean the trials look at the carbon impact of different techniques, including fuel use, but the first year of the work is concentrating on the viability of alternative techniques compared with conventional weed control with herbicides.

In total, 10 treatments are being evaluated in two replicates. A Smart variety, BTS 9485, was chosen to allow both conventional and Conviso

One (foramsulfuron+ thienencarbazone) herbicide tolerant weed control to also be compared in 12m strip treatments, alongside a 6m untreated control.

"Hopefully that'll provide some independent information on whether there's any yield difference from using Conviso One rather than conventional herbicides," says Pam.

Both a one-hit only approach of Conviso One, and an early conventional spray at expanded cotyledon and one-hit of Conviso One will be compared with a traditional three-spray conventional herbicide approach based on phenmedipham, ethofumesate and metamitron.

Those treatments are mirrored in another three treatments with the difference being the herbicide is applied using a band sprayer, while between the row weed control is with a Garford camera-guided hoe.

"Band spraying will reduce the amount of herbicide being used," says Pam. "Is this a way to help retain approvals of some herbicides and be a more acceptable option? Ideally the next step will be spot spraying weeds — 'green-on-green'," she adds.

Another treatment will be hoeing only. "Using no herbicides looks good on paper, but in our soils, we might not always get good results from



Pam Chambers questions whether band spraying to reduce the amount of herbicide being used could be a way to retain approvals of some active ingredients. Pictured with companion, Herbie.

mechanical weed control only. In dry conditions, it can be too hard to get the hoe in, while if it's too wet, there can be weed regrowth.

"We've already learned that you can't use camera guidance very early as the beet are too small to get a good line," she points out.

The last two treatments will use a combination of available weed control techniques as chosen by Pam and the farm's agronomist. As well as weed control assessments, relatively unusually, the plots will also be yielded through hand digs with tare house tests to determine % sugar so that adjusted yields can be obtained, concludes Pam.

“ Anything we can do to minimise the risk by using an integrated approach will limit the breakdown of a tool. ”

A cercospora quandary

With cercospora now of high concern for both industry experts and growers, there's been a shift in perception of the key sugar beet diseases. CPM facilitates this month's Real Results Roundtable which weighs up the threats for the season.

By Janine Adamson

As well as the old trouble makers such as powdery mildew and rust, UK sugar beet growers now have to contend with a new foliar disease — cercospora leaf spot (*Cercospora beticola*).

With reports from Europe of resistance to some fungicide groups and an ability to adapt to climatic conditions, cercospora has fast become the number one foliar disease concern for industry experts.

For this Roundtable, CPM brings together BBRO's head of science, business development Professor Mark Stevens; BASF's business manager, Iain Ford; and farm

manager, Michael Wilton from the Stody Estate in North Norfolk.

The Stody Estate is a family-run business with an arable enterprise which operates a wide rotation including milling and feed wheat, malting and feed barley, oilseed rape, sugar beet, maize, rye, vining peas and beans. The business also has a diversification which offers visitors access to one of the largest rhododendron and azalea gardens in the country.

The discussion at hand is the shifting importance of different sugar beet foliar diseases, the current state of this season, and the role of a robust and fully integrated control strategy.

Seasonal disease challenges

To open up the discussion, Mark provided context on the current challenges following difficult autumn and spring conditions for sugar beet. “The consequence of the mild, wet winter is an impact on this season's crop. As we speak, one outcome is that aphids have overwintered in large numbers and consequently virus yellows is higher on the risk register — everything that we were anticipating with modelling and forecasting is coming to fruition.

“And with very few frosts in February and March, the risk for diseases such as powdery mildew will be high because we've

potentially provided a perfect green bridge for diseases to overwinter. We know that from previous work, the level and extent of powdery mildew is correlated to the number of ground frosts in these months,” he explained.

Mark added that temperatures in February were up to 4°C warmer than ▶



Cercospora is a disease which is quite stable under cool conditions, hence why it's becoming a greater problem in the UK, said Professor Mark Stevens.



Michael Wilton sees the benefit of a three-spray programme in terms of sugar beet green leaf retention.

▶ the long-term average. "It'll have to be monitored very closely and will potentially be the first threat of the season when it comes to disease control. However, if we do experience wet, cooler weather, that can temper an outbreak."

Aside from mildew, another 'traditional' disease to be conscious of is rust, continued Mark. "The weather had a considerable impact on rust too last year, with high levels in October and November due to the mild autumn. It's a disease that'll have carried over which means that pressure will be building for 2024," he stressed.

However, the 'new kid on the block' is cercospora, which BBRO is actively researching. "Up until recently, it was a disease of mainland Europe where it tends to favour beet crops grown under warm/hot conditions with high humidity," said Mark.

"But it's also a disease which is quite stable under cool conditions, hence why it's becoming a greater problem. One aspect that we have to be careful of, is again, the green bridge. We've found that some management techniques such as no-till or min-till where surface trash remains post-harvest, could be contributing to increasing threat levels," he explained.

In response, Iain questioned whether growers could expect to see earlier levels of disease this year compared with



As of last year, Revystar XE became available for use in sugar beet crops.

previous seasons.

Depending on what happens between now and July, Mark said he wouldn't be surprised to see early powdery mildew in crops. "Although we do have to temper that slightly with a lot of the crop going in late, and often, it's growth stage driven for when we start to see these diseases," he said.

Providing on-farm context, Michael said he finished lifting the Stody Estate's beet crop on 24 March, which he's never known to be so late before. The crop then remained in clamps until around 8-9 April.

"With the current regime of not over-topping beet, this means you undoubtedly leave an element of green on those crops even when they're in a clamp. You're creating a fantastic microclimate which creates all sorts of problems and a source of infection," he explained.

Michael also pointed out the off-on nature of drilling for this campaign's crop, with some plantings only just emerging. "They're not enjoying the cold, wet weather particularly, and compared with last year which again was late, initial growth is very slow."

Robust control

Where good fungicide programmes have been implemented, how much of a reduction to risk does that represent? — that was a question posed by Michael to Mark.

Although acknowledging it was a fantastic point, Mark said he wasn't sure he could provide an exact answer as it will depend on the diseases present, their prevalence and weather, as well as variety selection too. "But what I will add, is we believe from everything we know about rust and powdery mildew, the isolates we have in the UK are susceptible to the portfolio of fungicide active ingredients currently available.

"We know that a fungicide spray will provide around 28 days of protection and by using a judicious programme of one, two or three applications, depending on when you're lifting, populations are controlled," he added.

But again, Mark raised the problem of cercospora, which he said is the most damaging of foliar diseases in sugar beet. "We're aware of resistant strains of cercospora, especially to strobilurin-based fungicide chemistry (e.g. QoI resistance) and this is being investigated as part of a new BBRO research programme.

"This is one of the reasons why the launch of Revystar XE (mefentrifluconazole+ fluxapyroxad) is so important for beet — it brings two different modes of action which protect each other while offering good

control in their own right," added Iain. He also pointed out the longevity of activity which Revystar XE can provide. "We know generally, we can achieve good activity for 4-5 weeks, and depending on disease pressure, sometimes up to six weeks after a two-spray programme.

"So depending on when those final applications go on, if it's September or October, then the period of direct activity on those diseases will only be about a month or so afterwards, which can then leave the crop open to further infection should the weather conditions allow," he said.

Michael added that last season, most of his crops received two fungicide applications with some having three due to being on lighter land and lifted later. "We definitely see the benefit of a three-spray programme in terms of green leaf retention," he explained.

However, current product choice can prove limiting and in some ways is concerning, commented Michael. "Where we're starting to stack the same active ingredient more than once within a programme, we're selecting for the resistance of that isolate to a particular product which in itself can't be a good strategy."

Mark agreed and said the frustration he has as a sugar beet scientist is the struggle for active ingredients. "That's the case for insecticides, for fungicides, and potentially herbicides; so managing resistance is critical.

"Anything we can do to minimise the risk by using an integrated approach will limit the breakdown of a tool. The one thing we can't afford to do is lose the fungicide active ingredient groups we do have because there's very little else," he stressed.

Integrated disease management

For Michael, he believes more focus has to be placed on varietal disease resistance. "Years ago, the advice would be to always lift your poorest crops first, but I think we have to be much more strategic and choose the varieties based on when we want to lift and from where," he said.

Mark concurred and stressed the importance of knowing where each variety is planted. "With some of the interesting new genetics coming on stream, you could have a high scoring resistant variety which you can look after with a couple of sprays and get it through until after Christmas, for example.

"It's making the most of the genetics alongside the chemistry and any other mitigation you might apply — a classic integrated disease management approach."

Then, he says monitoring is the basis of effective control and a key part of integrated disease management. "The BBRO is investigating a new monitoring system using solar-powered 'spornados' which essentially sample the air to detect for rust and cercospora.

"These could give an early warning for when spores are present and used alongside localised weather data, help to fine-tune applications. Of course, the earlier you stop a disease the better it is for the plant to keep growing and develop the physiological benefits for yield performance and sugar concentration," explained Mark.

Another element of integrated disease management which is important to Michael is plant health, he pointed out. "Early in my career we used pesticides to promote plant health but now we have to use nutrition instead; we've seen a step change in how we approach it.

"It's about unlocking some of the plant's natural mechanisms to enhance its genetic capabilities, it's something that we can't ignore."

In response, Mark added that alleviating stress particularly in the early stages of a crop's development is important and part of this is ensuring macro and micro-nutrients are adequate.

"If you have deficiencies you start to open up the risk of greater sensitivity and susceptibility to foliar diseases down the line. A different disease which we haven't discussed is alternaria — anything that causes a leaf to go yellow, or if you compromise a plant with other diseases, means alternaria can quickly establish itself," he said.

According to Iain, integrated management is the backbone of BASF's approach. "The healthier we can keep the plant, the more able it is to withstand further attacks, but also we can enhance that through utilising crop protection as well," he commented.

Around five years ago, the Stody Estate started to conduct fortnightly SAP analysis, explained Michael. "It's not cheap to do but it's allowed identification of the key micronutrients which are always deficient in various crops; it's a crucial management tool.

"We're unlikely to see an economic return from conducting the testing in isolation, but as part of a wider integrated management programme, it will add up," he said. "If you don't monitor, you can't manage it. We have to be much more focused in how we look after plant health, the implications of pesticide use, and be justified in what we do."

Revystar XE in sugar beet

As of last year, Revystar XE became available for use in sugar beet crops. Whereas previously the product had been available for use in cereals, Iain said he was impressed at how well it performs in sugar beet.

"We know both Revysol (mefentrifluconazole) and Xemium (fluxapyroxad) are providing activity against cercospora, mildew, rust and ramularia. That's led to Revystar XE having a very rounded and broad-spectrum disease control," he continued.

Iain believes another benefit is the product's physiological effects in helping to maintain green leaf area. "A lot of that will come from the Xemium component which can in turn lead to an increase in yield over not only untreated crops, but competitor treatments as well, even in the absence of disease," he said.

Michael explained that he used Revystar XE in his sugar beet crops last season whether that was a one, two or three-spray programme and that the green leaf area retention was notable, leading to an improved canopy.

Furthermore, Iain added that having a healthier, green canopy can help a sugar beet crop to better withstand frost and therefore protect its yield potential". This is something that we've seen in trials during the past two years when two applications of Revystar XE were made within the fungicide programme," he said.

As well as sugar beet, Michael has used Revystar XE for a number of years on the farm's cereal crops and has found the product to mix well with no formulation problems. His only concerns are related to resistance management and the different rates of application.



The healthier the plant, the more able it is to withstand further attacks, but that can also be enhanced through using crop protection products as well, said Iain Ford.

"I'd like to understand when the 0.8 l/ha rate is appropriate to use in beet, assuming it's related to disease pressure and crop potential," he said.

In response, Mark said due to the risk of cercospora, he was more comfortable with the higher rate of 1.0 l/ha, although the lower rate is effective on rust.

According to Iain, this is something BASF intends to keep a close eye on. "In the first instance, we've tried to devise recommendations that are both practical and cost-effective. We know that the 0.8 l/ha rate will provide good control of rust and mildew; we're happy for growers to use that to avoid over-spending where these are the target diseases.

"However, when it comes to cercospora, 1.0 l/ha is the required rate to achieve a satisfactory level of control. Equally, to have the most longevity out of a second spray, which could be in the middle of September, I'd support using the higher rate to maintain disease control and green leaf area for as long as possible," he concluded. ■

Real Results Roundtable

BASF's Real Results Circle is a UK-wide agricultural network now in its eighth year. The initiative is focused on bringing together growers, industry experts and BASF to create a more resilient farming system that's sustainable for farm business profit, for the people we feed and for the planet we live on.

Real Results Roundtable is a new initiative which explores related topics, such as resilient disease control, environmental stewardship and return on investment. Roundtables centre around Real Results Circle farmers and associated experts from the wider industry.

By coming together to openly discuss and

therefore face challenges as one, we can find out what really works and help to shape the future of UK agriculture.

CPM would like to thank BASF for kindly sponsoring this feature, and for its assistance in providing access to the relevant experts and contacts required to produce it.





“ We’re confident when growers use the PET system, they’ll see fry colours as good as they get with any other product. ”

SPot store event

Could ethylene finally be used safely in crisping and chip shop potato stores? CPM hears about advances in its use at a GB Potatoes SPot store event, run in conjunction with Potato Storage Insight and SDF Agriculture.

By Mike Abram

New technology that introduces micro-doses of ethylene into potato stores is being claimed to overcome the impact on crisp and chip fry colours — one of the main drawbacks of its use in those sectors — while still maintaining sprout control.

Ethylene is a naturally occurring plant growth regulator and, when maintained at suitable levels in stores, inhibits the elongation of sprouts. Since the loss of approval of chlorpropham (CIPC), it’s emerged as a relatively cheap alternative for packing and in some processing stores.

But concerns over darker fry colours have ruled out its application in potatoes destined for crisping or for use in fish and chip shops.

Such darker fry colours are caused when ethylene stimulates increased respiration rates in the potato, resulting in a sugar spike when starch is converted into reducing

sugars. When the potatoes are fried, a chemical reaction occurs between those sugars and amino acids to produce a characteristic browning.

If the sugar level is too high in crisps and chips, that reaction goes too far beyond the desired pale golden colouring and consumer acceptance diminishes.

Ethylene detection

Research from the 1970s revealed there was an intrinsic link between tuber respiration and initial ethylene concentration, but it hasn’t been easy to manage because potatoes can detect ethylene at lower levels than the best currently available sensors can detect, explains Paul Coleman, director of technology for ethylene system supplier, Restrain.

“That’s why a lot of the time where fry colour hasn’t been great after the use of ethylene, it’s because of the way it’s been introduced,” he continues.

Both Restrain, which converts liquid ethanol into ethylene in a generator, and Biofresh, which pumps bottled ethylene gas into store through its ethylene management unit (EMU), use a ramping up system to introduce initial low doses of ethylene into the store before achieving the concentration required for sprout control.

The idea is, that helps the potato to acclimatise to the ethylene, reducing the impact on respiration rates and therefore reducing sugar production within the tuber. But the limit on being able to detect ethylene has knock-on constraints in being able to

control the change in respiration rate in tubers.

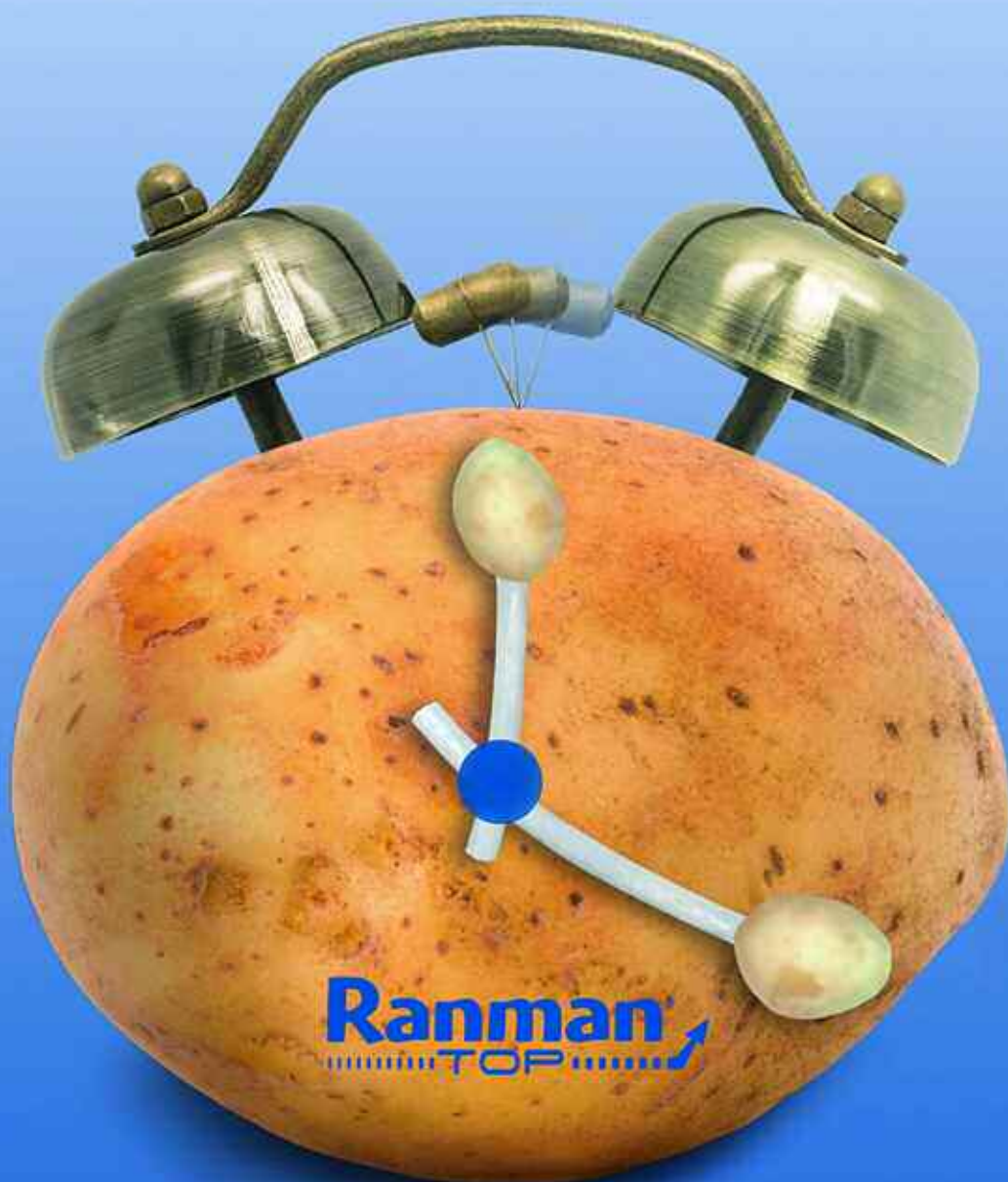
“The challenge has been how do you introduce parts per billion of ethylene into stores, rather than parts per million,” says Paul.

But now, Restrain technical manager Adrian Briddon has created a way of delivering such super low doses into stores using the software and technology in the Restrain generator. “This software delivers micro doses of ethanol into the generator, which produces ethylene at just parts per billion level into the store,” explains Paul.

“We can’t detect it with sensors, but the ►



Potatoes can detect ethylene at lower levels than the best currently available sensors can detect, explains Paul Coleman.



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► potatoes detect it. Each day we build that up so the potatoes receive a slightly bigger dose but the respiration rate isn't reacting, you achieve a much flatter ethylene respiration response rate."

The process takes around a week and is now fully automated and the same for all varieties. After a week, Restrains conventional slow-start ramp-up begins when the ethylene concentration has reached the sensor's lowest detectable level of around 0.1ppm. That slowly increases to 10ppm — the level required for sprout

suppression — during a period of 21 days.

But in comparison, the new Precision Ethylene Technology (PET) system starts at levels around a 100-fold lower, says Paul. "It's a tiny amount of ethanol going in, but the clever thing is we can control it, which we weren't able to do in the past."

Trials on three crisping varieties, selected because they respond to ethylene by producing higher levels of sugars, show much better results than using ethylene without PET through PepsiCo fry test protocols.

"For example, the new variety VR808 can be fried without any concerns for colour using the PET system, and also SCH1010 which again now looks superb for fry colour."

The results are equivalent to potatoes stores treated with 1,4Sight (1,4-dimethylnaphthalene), he adds.

These trials, however, have been conducted on crisping varieties stored in French fry processing stores, admits Paul. "These are 20°C colder than what the crisping industry uses, so we'd like to get some potatoes in crisping stores treated."

The outcome of a difficult storage season



A thermal imaging device can help to analyse insulation breaks or inefficiencies in store, says Adrian Cunningham.

Observations from one of the most difficult potato storage seasons in recent times include the importance of good air systems for drying potatoes quickly after harvest, says Adrian Cunningham.

"The value was crystal clear — if you don't have enough air in your store, you're at risk of losing a crop in a wet season.

"Some crops went into store and came out again within a matter of weeks because they were too wet. You can't store wet potatoes so you have to get them dry, and therefore require a way of forcing air through them and getting the moisture out," says Adrian. "If you don't, then you're on a down slope pretty quickly."

Positive ventilation systems, such as the Aspire system for boxes demonstrated at SPot store event host Winters Lane Storage, near Long Sutton, showed their worth, he notes.

"Aspire is a positive ventilation system where the air comes out over the top, falls into a gap either side of the boxes. It goes into the potatoes down those lines, and is then drawn across the boxes so you get lateral air

movement across the store," explains Adrian.

This season, the store was loaded late with a wet crop lifted after weather broke in mid-October. A high rate of airflow was used to dry the crop aggressively, which had been treated in-field with maleic hydrazide, before being run at a temperature of 3.5°C with Biofresh ethylene applied.

While energy use in the store was relatively high at 115kW/t during the season, only 17 boxes from 400 were lost to rot, he says. "If those boxes had gone into a different store without positive ventilation, I think the outcome would have been catastrophic."

Investment in improving stores should, in theory, be made a little easier to justify with current higher potato prices, suggests GB Potatoes chair, Mark Taylor.

"Off the back of some better prices, the industry has a little more confidence again, but it's important we stop lurching from one season to the next and start thinking longer term.

"Our cost base is still considerably higher than pre-2021, so we do require the market prices we see today. Those prices are required to reinvest in our industry, for example, in storage assets that are generally getting older. We store around 60% of the national crop so it's something we have to get right," continues Mark.

A thermal imaging device — an iPad with a camera attached — can help analyse insulation breaks or inefficiencies in store, adds Adrian.

"That's crucial when we work out how many kilowatts we're going to use, as that equals money. Cutting down on excess leakage or temperature loss helps to prevent fridges running longer and higher electricity bills. We have a lot of older stores that we have to know how to upgrade."

One example of an older store being relatively simply upgraded was at the second host site for the SPot storage event at a store being used by S&S Pugh in Gedney Dyke. An old ambient store it was converted to an overhead throw



According to Mark Taylor, investment in improving potato stores should be made a little easier to justify with current higher potato prices. Photo: Mike Abram.

refrigerated store for the fresh market 20 years previously, explains Adrian.

Upgrades to the store include a new controller installed by Crop Systems which allows data to be relayed to the store manager's phone rather than being under simple regular thermostat control.

"Just by changing the controller you can make a difference in the way you operate the store on a daily basis," he says.

Other upgrades have been adding a secondary door inside the main door, which seals the aperture completely, and a fresh air flush as it's now storing processing crops that helps to regulate CO₂ levels.

An upgrade Adrian would like to see is an improvement to air flow from the vertical discharge ducts. "This store has no curtain, goalpost or plenum, and looking at the roof you can see dust where the airflow is ending up — not clearing the first beam.

"That's common in overhead throw stores and requires some air straighteners to get air thrown to the back of the store," he concludes.



Simon Faulkner is unsure whether a micro-dosing approach will be enough to persuade crisping potato growers to change to ethylene. Photo: Mike Abram.

Ethylene use in potatoes stored for French fry output is much more accepted, with McCain comfortable with its use. “The big difference between McCain French fries and chip shop chips is in a French fry factory they blanch the potato — wash it in hot water. That removes the sugar from the outside and helps to create the crispy texture. It’s then allowed to dry before frying and that process reduces fry colour risk.”

Despite the lack of testing in commercial crisping or chip shop potato stores, Paul believes the PET system will prove to be a big step change which will remove grower concerns surrounding fry colour in both the crisp and chip shop sectors.

“We’re confident when growers use the PET system, they’ll see fry colours in the chip shop and for crisps as good as they get with any other product.”

Industry experts agree the ramp-up procedure is crucial for best results from ethylene. Potato agronomist and storage expert Simon Faulkner from SDF Agriculture has been using a less sophisticated process of using a ‘sniff’ of ethylene in processing stores before turning the production off for four or five days and then starting a ramp up.

That’s worked well, he says. “It does appear a small application is beneficial to controlling fry colours — I’m getting enough dose in to acclimatise the potatoes before ramping up.”

Convincing growers

He’s slightly more cautious about whether a micro-dosing approach will be enough to persuade crisping potato growers to change to ethylene, however. “I think growers remember some of the issues they had with ethylene when it was first introduced, which caused quite a lot of crop downgrading or loss.

“So they’re likely to be cautious. At some point, someone will ask about whether a company will underwrite its use, which opens another can of worms about how the store is managed, so it’s quite difficult.”

Potato Storage Insight’s Adrian Cunnington says micro-dosing is a good way to take ethylene forward. “The big issue we’ve had with ethylene is that its application



The SPot store event was hosted by GB Potatoes, Potato Storage Insight and SDF Agriculture.

was too clunky, especially before the ramp was brought in. Now they’re trying to refine it to get the ramp working better.

“The principle is right, because tubers react to too much ethylene — it’s like giving you a shot of adrenaline.”

Even so, he too thinks crisping and chip shop growers will remain reluctant to use ethylene. “The chip shop market has dabbled with ethylene and come unstuck so that’s not where you want to be. We want a little more confidence before giving people recommendations.”

He also believes there’s a desire for an earlier and better testing system for assessing ethylene risk in varieties. “Varieties are introduced into the market and then it’s thought whether to use ethylene. That’s the wrong way round — we should do the ethylene work earlier in the process so you can establish whether the variety works with ethylene or not,” suggests Adrian.

A potential alternative to managing the sugar spike in tubers with ethylene is to use recently approved 1-methylcyclopropene (1-MCP).

“It’s an ethylene blocker that’s supposed to inhibit the sugar spike,” explains Simon. “You apply it as 1ppm. Allow the crop to settle down; cured and down to your holding temperature and then apply it as a single dose before you start the ethylene treatment. It costs around £6/t.”

A trial he conducted on behalf of GB Potatoes for the SPot storage event in Lincolnshire compared the in-store use of 1-MCP in combination with ethylene, with 1,4Sight across a range of processing varieties. A fry test was then conducted on each variety.

“There was a difference in fry colours between the two, but it was very subtle,” says Simon. “The question is whether growers want a marginal difference for a cost of £6/t,” he concludes. ■

Residue data still required

Store managers are being asked to submit CIPC residue data to the CIPC Residues Monitoring Group (CRMG) to help prevent the Maximum Residue Level for the product being set to the limit of quantification (0.01 mg/kg).

Residues left in potato stores following CIPC use were reduced substantially by intensive store cleaning in the initial years following its withdrawal, explains Mark Taylor, chair of GB Potatoes. “But we’re still dealing with the legacy of decades of use of CIPC.”

Good store management, including the continuation of cleaning regimes, exposing boxes to sunlight and ventilating stores will all help residues dissipate, says Mark.

However, the Chemicals Regulation Division is asking for evidence that good management is reducing CIPC residues. It set a temporary MRL of 0.35mg/kg in April 2024, which is

workable, but it’s only for a limited time period, according to Mark.

“European store managers have started to reduce their levels and CRD is saying to the industry we’d like the UK to demonstrate residues are reducing. So we require the data.”

Data from at least 120 stores has been requested by CRD to be received by August to prevent the MRL being lowered to the limit of quantification, which would make previously treated stores unusable.

“At the moment we’re only about 50% of the way to that target so we require industry’s help quickly on this,” adds CRMG independent chair, Adrian Cunnington.

Store managers can submit anonymised CIPC residue levels from regular compliance testing to the CRMG through Adrian at PSI (adrian@potatostorageinsight.com).

Blight management

With plenty having been said about the confirmed withdrawal of mancozeb, growers and agronomists alike will be developing alternative protection strategies. But with recent regulatory changes, is this straight forward?

According to ProCam's Harry James, although alternative active ingredients are available, the rules and regulations surrounding their use, and application intervals, aren't entirely straightforward.

"For example, instead of being able to apply three consecutive applications of CAA (carboxylic acid amide) fungicides, the latest FRAC (Fungicide Resistance Action Committee) guidance is that these should be limited to a maximum of two consecutive applications," he explains.

"That's a sensible recommendation based on the loss of efficacy of this group of fungicides on the continent, with crop protection manufacturers such as Syngenta going a step further by advocating the use of mandipropamid in alternation with fungicides with a different mode of action."

Mancozeb's expiry date has now been and gone (31 May 2024) with the final date for sale and supply of all products containing the active being 31 November 2024. Furthermore, the final storage, disposal and use-up period ends on 31 November 2025.

Complications arise in that resistance to oxathiapiprolin (Zorvec) has been confirmed in some parts of northern continental Europe including the Netherlands, Belgium and Germany, as such the

post-Zorvec application interval has been reduced from 10 days to seven. It must also be used in alternation with non-CAA chemistry.

"This makes it more labour intensive and time consuming to keep crops clean especially as this key active no longer provides a curative effect," stresses Harry. "Instead, it can only be relied upon to deliver preventative activity which means sprays will have to be applied on-time, every time, for crops to remain protected.

"To avoid potential confusion, UK potato growers should seek advice from their agronomist or industry experts to help devise a suitable blight programme for this season and beyond," he adds.

Harry says growers should also be aware that although fungicide resistance hasn't yet been confirmed in UK crops, pressure remains high and is further escalated by the shortfall in British seed potatoes, meaning there's a risk of resistant strains being introduced by imported seed stock.

"The high incidence of foliar and tuber blight in continental seed crops means there's a very real risk of resistance affecting British crops," he continues. "For that reason, anti-resistance strategies — alternating modes of action and limiting the exposure of any single active — must be followed from the outset.

"Keeping a close eye on resistance updates throughout the season will be essential, as will taking professional advice to devise a suitable spray programme. Not least because the ever-changing legislative position and evolving resistance situation will make



Instead of being able to apply three consecutive applications of CAA fungicides, the latest FRAC guidance is that these should be limited to a maximum of two, says Harry James.

keeping abreast of the latest rules that much more complex."

According to Harry, growers and agronomists should still be able to achieve good levels of blight management and as a result stay ahead of the threat of resistance. "However, the key to reliable control will be adapting programmes according to weather conditions and to use forecasting tools to determine when the threat of blight is at its highest.

"Cultural controls, such as selecting varieties with better natural blight resistance and taking extra care to remove volunteer potatoes from dumps and other crops in the rotation, should also be factored into the equation.

"Nothing, however, will beat getting into the field and putting boots on the ground to assess the crop, the severity of disease pressure and if a blight infection has occurred," he concludes.



The withdrawal timeline for mancozeb has been confirmed; the product's expiry date has now passed (31 May 2024).

Confirmed withdrawal timeline	
Expiry date for mancozeb	31 May, 2024 (now passed)
Final date for sale and supply of any plant protection product containing mancozeb	30 November, 2024
Final date for storage, disposal, and use of any plant protection product containing mancozeb	30 November, 2025



last word

by Janine Adamson

Ruminating regret

In my opinion, it's all too easy to claim that you have no regrets — that the decisions you've made along the way have all contributed to the person you've become today. And while in some instances this may indeed be true, I believe with a little scrutiny, we can all identify points in our lives where we could have done things differently.

It takes a considerable amount of self-confidence (and perhaps ego?) to explicitly state the 'no regrets' line, mainly because our actions don't only impact ourselves but they affect others too. Perhaps that's why I find those who loudly shout 'no regrets' so stomach-turningly arrogant. I guess it's a matter of perspective.

This isn't about chastising ourselves for making mistakes, far from it. It's about being truly honest and recognising we have much to understand of our errors; that sometimes we have to just accept we've messed up. And because regret isn't the most pleasant of emotions — it's linked to remorse, sorrow and disappointment — I can understand why it's easier to bury one's head in the sand than take a moment to reflect.

I'm reasonably sure I won't be alone in my regret having a theme. It's rarely what I did

do, it's more regretting what I didn't do...or say. And therein lies the crux of the matter. So much is said by saying nothing at all — with either a positive or negative outcome depending on the circumstances. Silence is golden but it can also be haunting.

I learnt this the hard way when my grandad unexpectedly passed away in his mid-70s — which is no age by today's standards. Together with my nan, they selflessly devoted much of what should have been their retirement to help raise me. I have grandad to thank for my love of classical music, opera and good grammar!

Given my own age, I was 20 at the time and studying at university, I was too concerned with trivial matters and was a world away from the emotionally aware person you find today. As a result, one of my deepest regrets is never saying thank you for the time, patience and unconditional love he gave to me when

others walked away. Perhaps he knew, but I really wish I'd bothered to convey my gratitude.

Fast forward to only last year, when my other grandad passed away having been unwell for the best part of 30 years. Simply put, I'd learnt my lesson and despite him not being the emotional sort (a typical old-school farmer), I was able to tell him how much he meant to me while he was fully *compos mentis*.

I did this for him, but his response was for me — I desperately needed to hear his words of love which given his stiff upper lip, were unexpected. It was a very special moment which has helped to ease the torments of grief — I said what I needed to say.

Beyond mortality, we'll all be faced with challenging or difficult moments in life where we either find our voice or don't. Sometimes we'll be graced with the opportunity to ponder the correct thing to do, other times it'll require a split

second decision.

It could involve a loved one or it could be a complete stranger. All I know is I don't want to increase my tally of 'I wish I'd said something-s', if I can help it. Because well-being-wise, I find them quite corrosive.

In the highly volatile world we live in, I acknowledge this approach has the potential to land me in hot water. But I'd rather break the silence to stand up for what's right than skulk away and ultimately facilitate. It reminds me of school — who's worse — the bully or the person who stands by and lets it happen?

Equally, we have to understand the impact of our silence in positive situations too — holding back on the kind words and compliments, whether it's deliberate or not. Saying nothing in these scenarios speaks volumes to the person involved.

But the bottom line is, I rarely think to myself, I wish I hadn't said that. I just regret what I didn't say, instead.



Whereas in the past I've not spoken up, I didn't want my grandad to pass and not know how much he was loved. (John Heath 1937-2023).

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⁶ European Field trial 2016/17, 2017, 2018 and 2019

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