

december 2023

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page 12**



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## The Editor's pick

**Not only is the festive season approaching but we are well into the winter show and conference season. This month's edition sees reports from BP2023 in Harrogate, the Southern Counties Farming and Machinery Show and a preview of LAMMA 2024.**

The main topic at BP2023 was the latest advice and updates on the continued threat of the Danish blight strain, EU-43-A1. As well as this there was enough news about new products to keep the keenest of potato producer interested. Further south, the Southern Counties Farming and Machinery show at Newbury Racecourse made a promising debut and we report on a fascinating seminar on using robots for growing vegetables on a large scale. Looking to the future, we also preview LAMMA, due to take place in early January. The return of several large machinery manufacturers is the main topic of conversation which should be an incentive for many people to get out after Christmas to see what they have to offer.

On the subject of potatoes, we also pay a visit to a farm in Scotland (p33) where they are using tools to maintain yield and marketability of their speciality crops.

Livestock make a brief entry into CPM as we visit a farmer in the borders (p30) who has started growing home-grown protein for his 32,000-bird free-range layer operation. This is major step in the campaign to achieve net zero as we look to growing our own protein for animal feed and reducing soya imports.

This is the time of year when many farmers are looking to market their crops and we take an in-depth look into the grain market and the global seismic events that are affecting it. (p39) There is some timely advice on when and how to market crops over the next few months. The best piece of

advice coming from the article is that you must have a Plan A, B and C!

While the application of fertiliser has become more and more technical, with modern spreaders and sprayers giving growers the ability to apply products with remarkable precision, the application of lime has remained in the realm of heavy machinery and applications once every five years (p42). We take a look at how this needs to change as only a minor change in pH levels can have a significant impact on soil biology. The use of heavy machinery is also not conducive to achieving net zero either.

CPM wouldn't be the magazine it is today without valuable contributions from our readers, whether that be farmers, agronomists or industry experts. However, nothing stands still. Therefore, we're looking for feedback from you to help to ensure the magazine remains the UK's best read specialist arable journal. If you could take a few moments to scan this QR code and complete the survey, there's a chance to win £100 of shopping vouchers.

Finally on behalf of all the team at CPM I would like to wish all our readers a happy Christmas and a prosperous New Year.

*John Swire*



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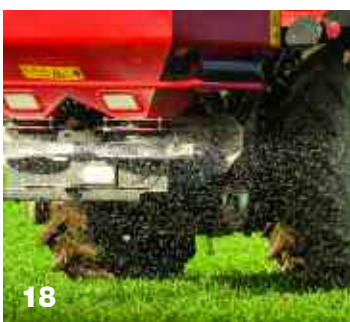
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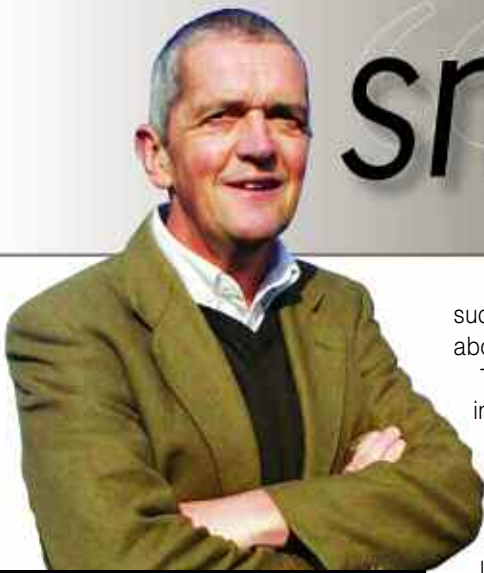
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# smith's soapbox

by Guy Smith

## Wet back-ends - the new norm?

**One throw away personal insult I've heard batted around the farming scene goes along the lines of 'if he just stayed in bed all day then he'd be a millionaire.'**

The intended slight being that the more active said hapless farmer, then the more money that was lost. God forbid anyone should ever make

such a derogatory observation about me.

The cruel fact is, given the increasingly challenging weather of autumn 2023 and the current prices of most combinable crops, if I had spent more of my days lying in bed filling in SFI forms, it would undoubtedly be a more lucrative use of my time.

Trying to keep things in context, it should be remembered that the much feared 'wet back-end' is nothing new to UK arable farmers. I remember my dad could be as anxious about wet weather in the autumn as he was during harvest. I should add that I was never entirely convinced by the bar room tales he and his drinking buddies told of combining on Christmas Day in the 1950s.

Either way, it does seem that rained-off drilling programmes are becoming the norm, whereas in the past they were the exception. Whether this is climate change at large, I'm not sure. I do recall some climate change modelling suggesting that a warmer climate in northwest Europe would improve crop yields rather than give us endless muddy seedbeds, making field work impossible. I'm starting to work on the basis arable farming seems to be becoming an increasingly catchier affair and best laid cropping plans will frequently have to be abandoned.

The bitter conundrum here is this: the climate seems to be becoming less conducive to growing half-decent crops and the world population continues to grow, so you might reasonably expect the global price for things like wheat to be ever skyward in a permanent bull run. But alas, there is no such golden lining to sweeten the bitter pill that is this autumn's vinegary weather.

So with a third of this season's planned winter wheat unsown, I'm cultivating a renewed enthusiasm for spring cropping, even if the

last two droughty springs have turned any prospects to dust. I've developed a new theory based on uncorroborated, fanciful evidence that the worse the weather in the preceding autumn, the better it is the following spring. So here's to 2024, what could possibly go wrong?

*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**

Away from the weather-beaten winter wheat, I've been taking some solace walking the dog in our AB15 Countryside Stewardship. Having sown a standard AB15 mix in mid-May, high pressure duly descended on northeast Essex, leaving our endeavours lying in dust. Undeterred, we re-drilled in late June with a mix of linseed, barley and fescue. It was the linseed that really grew away, to the point that by November, it almost looked like a crop worth combining — not that the weather or the rules would have allowed.

Aside from the 1000kg/ha of high-protein bird-seed to sustain thousands of little brown jobs through the hungry winter months, I was interested to read linseed has an excellent nitrogen/carbon ratio, making it a good carbon sink. So here's to linseed, the new wonder crop that answers multiple environmental challenges.

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## Wheat through the ages

# Exploring the genome

**Modern wheat breeding is constantly advancing, bringing yield and agronomic improvements to the table every year, but could looking back at old varieties bring something new to the table? CPM explores how one scientific project is doing just that.**

**By Melanie Jenkins**

**For at least 8000 years, wheat has been a staple food source across large swathes of the world and is now one of the most common crops grown. But the rising human population is demanding more of this grain than ever before.**

Overcoming some of the increasing pressures on growing wheat and producing enough to feed the world is a task that breeders are tirelessly working on, it's something that genomic sequencing is helping with. "Wheat is a fascinating crop," according to RAGT's Dr Richard Summers. "The crop came about as a natural hybridisation of three wild grasses, so from a breeding perspective, there's the potential to access useful genes in ancient bread wheat that are hexaploid, meaning they have the genetic composition of the three grasses.

"When this happens, you can go back into old collections of wheats to look for new traits and you can even go back to the wild

grasses that formed this hybridisation. There are some constraints, but the amazing thing is that between wheat and the related grasses, you can intercross them without the use of genetic engineering."

### Adapted for our systems

So there's a question about whether there are genes that have been left behind from modern varieties, says Richard. "Over the past 100 years plant breeders have bred varieties adapted for our farming systems. This doesn't mean we've been breeding varieties that aren't resilient, but that modern varieties are bred to be grown under higher fertilisation and to produce higher yields. Although some might say these varieties require more husbandry to reach their potential, I believe that modern varieties grown in lower fertilisation situations and in poorer conditions, would still outyield some of the ancient types."

In terms of what breeders have been able to achieve, they've managed to change the idiomorph of the crop so that more of the above ground matter ends up as grain that can be harvested — the harvest index, he explains. "The thrust through wheat breeding is to produce high yields and this has a huge socio-economic impact."

One of the issues with some of the current constraints is whether breeders can bring in better disease or heat stress resistance, he points out. "When we look at our current cultivated wheats, we won't have enough diversity to cope with these challenges. So by going back and looking at old collections we might be able to identify where bottlenecks of selection have left some useful genes behind."

This won't be a magic bullet, stresses



**“ Breeders live for diversity to be able to advance breeding. ”**

Richard. "We won't suddenly find a gene that will allow wheat to cope with a 2°C rise in global temperatures in an archive. ▶



*According to Richard Summers, by looking at old collections of wheat we might be able to identify where bottlenecks of selection have left some useful genes behind.*

# Wheat through the ages



*For thousands of years wheat has been a staple food source across large swathes of the world and is now one of the most common crops grown.*

► However, looking at a collection of wheats that were growing in warmer environments will likely include some useful genetic material, that if we can uncover it, could be useful today.”

The problem is how to uncover this material. “You either have to know something about the genes you’re trying to look for, or about the characteristics which are under genetic control that will provide some of the things you’re looking for. So how do we identify what is a beneficial gene and then how do we find it? Looking at historical collections we can see what variability is there, but at the same time we have to be informed about the current genomic studies.”

Sequencing allows for the identification of genes and can help to speed up and

improve breeding, explains Dr Matt Clark of the Natural History Museum (NHM).

“There are two ways of knowing whether a plant is going to be potentially useful: one is to look at it and the other is to look at its DNA,” he says. “When looking at a plant, it’s not always obvious what’s going on because with a trait like yield there may be thousands of different genes contributing to this and some will be affected by the environmental and seasons. Whereas looking at genetics provides a more absolute answer and the ability to pick genes.

“Wheat yields are already increasing by 1-3% per year through various breeding efforts, but if you look at the DNA it’s possible to see where each gene adds to the overall yield. This would be hard to see in the field but genetically it can be picked

up and allows breeders to stack these genes in a new variety.”

Matt, who is the lead researcher on the NHM Wheat Through the Ages project, was one of the team tasked with originally sequencing the wheat genome while at the Earlham Institute. “This was a complex and expensive undertaking because there are three genomes, so to make it feasible he used short-reads, where the genome is broken into small fragments before being sequenced. But at 100 bases long it was a struggle to tell the difference between the A, B and the D genomes.”

## First wheat genome

However, this allowed him to sequence and assemble one of the first wheat genomes.

“We were due to sequence two of wheat’s 21 chromosomes but in the end sequenced the entire genome,” he explains. “We also created a tilling population, which involves deliberately mutating an organism to make changes to the DNA, and then made probes for each of the chromosomes, so that instead of sequencing the whole 15-17 gigabase genome, we could just sequence the 0.1 gigabase that make genes. This was then sequenced for each of the different wheats that were mutated, and we could subsequently work out what the mutations were.

“This was put into a database of all the genes and different mutations. Because we then knew a sequence, we could predict what a mutation is likely to do.”

This then led to sequencing NIAB’s Elite Magic population, which is an eight-parent population, says Matt. “This is where eight elites from the AHDB Recommended List were crossed, and it covers 90% of the genetic diversity in the UK wheat germplasm from the late 1980s. The aim was to get around a thousand offspring which have DNA from each of these parents mixed up in different combinations which has been used to do trait analysis and to map different genes.”

To gain an understanding of wheat genetics from outside the UK, the researchers brought in two varieties that were quite different — a heat and a drought resistant variety which are used in programmes for the developing world — from the International Maize and Wheat Improvement Center (CIMMYT).

From here, this led to involvement with the 10+ Wheat Genomes Project, which helped pave the way for further research when it sequenced the genome of 16 wheat varieties from breeding programmes around the world, identifying how much ►



*Researchers at the Natural History Museum, Kew Gardens and the Hebrew University of Jerusalem have been digitising their wheat archives to see how the wheat genome has changed.*



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# Wheat through the ages



*There's potential to access useful genes in ancient bread wheat which are hexaploid, meaning they have the genetic composition of three grasses.*

▶ variation there is in wheat.

"We've gone on to skim sequence DNA from 92 crop wild relatives, which were chosen based on a study from CIMMYT, which had genotyped about 100,000 different wheat varieties included 8-9000 wild relatives. This has given us an idea of what is going on in wheat," explains Matt.

Now, researchers at the Natural History Museum, Kew Gardens and the Hebrew University of Jerusalem have been digitising their wheat archives to see how the genome has changed and there are hopes to identify genes that could help breeders in their task to produce more resilient varieties. The Wheat Through the Ages project involves sifting through 13,000 specimens from the NHM and 7-8000 more from Kew, plus others from Israel of the Triticeae family, which includes wheat, barley, rye and wild

crop relatives, which dates back 300 years. "The aim is identifying how wheat has changed over time," says Matt.

The project is still in the early stages of looking at historical varieties with the first round of analysis currently being conducted. "There's a lot to do with around 200 varieties that we now have some level of sequencing on," he explains.

"We're interested in identifying genetics we might have lost such as quality traits that it might be useful to bring back into modern breeding, and also if historical varieties had high yields with fewer inputs than what we've become accustomed to using.

"There are multiple genetic pathways that could allow for this," says Matt. "Firstly, it's about having a better symbiotic relationship with the microbes in the soil — the bacteria and fungi — which the plant

is supplying with sugar in exchange for nutrients. But in a modern field environment, there'll be a lot of nutrients available to a plant, so why would a plant supply its sugar to the bacteria when it's not short of anything. Because of this, we're interested in looking at whether this has been selected out because it's become less useful."

Beyond this, Matt and the team are keen to explore the capabilities of the pumps in different varieties which move the nutrients from the soil to the rest of the plant, as well as the efficiency of use and the recycling of nutrients such as nitrogen. "We may well also come across resistances or abilities to tackle marginal situations and it would be nice to find varieties that are more efficient at using fertiliser as this is both beneficial for farmers and the environment."

One challenge with trying to incorporate useful diversity comes in the form of payoff, says Richard. "For example, if material was discovered that appeared to have better water use efficiency and resistance to drought — which could be a mix of all sorts of things such as a different leaf or root structures — but it comes with a 10% yield hit. It might be that one of the reasons this hypothetical variety survives is because it doesn't respire and grow as strongly as another variety would with unlimited water. But this in itself could be useful as it could provide a crop that grows in a more challenging environment."

Disease resistant genes also pose their own issues related to durability, he highlights. "If we find a genetically inherited source of resistance in an ancient wheat, we might be able to transfer it but there's no

## Sequencing

So just how is the team at the NHM digitising and sequencing its historical collection? It's a complicated process because the material in the archive is degraded because it's older, meaning the DNA is broken in smaller pieces, explains the Natural History Museum's Dr Matt Clark. "First of all we have to convince the curators that we're doing something valuable with their samples.

"We've tried using different tissue types including the leaves, roots and awns, but if you cut a leaf off it's fairly obvious, but you can get away with cutting the end of an awn fairly easily.

"We disrupt the tissue physically by shaking it up with steel balls which turns it into dust, and then we extract the DNA using a mixture which protects it from degrading and then bind it to magnetic beads," explains Matt. "There are

specialist techniques for making the libraries where we put adapters onto the DNA to deal with these short damage parts of DNA."

The DNA is around 50 base pairs in size once sequenced with Illumina technology, but if this was done with a modern plant the team would be able to take 300-500 base pairs. "We can sequence on a larger scale if we use a different platform such as a nanopore sequencer where we could take 40,000 base pairs."

From here, the samples are processed and put together in a sequencing run. "Each library from every sample has a DNA barcode that indicates which sample that piece of DNA belongs to. It's more affordable to run all of the samples together but the barcode allows us to sort them out afterwards. We then map the DNA to the different genomes and can



*Sequencing historical wheat varieties is a complex process due to the material in the archive being degraded, meaning the DNA is broken in smaller pieces.*

determine how much has mapped and how complex the library is. From this point, the team is able to identify the differences, or polymorphisms, between the reference wheat genome and what they've sequenced."

guarantee that it'll last more than a few years before the disease responds and the gene is overcome. However, it could provide another source of diversity to replace any resistant genes that are being broken. And some work being undertaken currently is actually looking into which pathways may be more or less durable."

If the team does identify useful traits, it'll take some time before the industry sees these come through in new varieties. "Material that is coming from the Magic population is so close to what's already being grown that it can come through in new varieties quite quickly, but it would take longer to incorporate traits from the historical material," explains Matt. "If we did identify a trait in one of these varieties, we would also have to find a specimen that's alive or we'd be using some form of gene editing technology — and this could depend on the legislation and the market."

It might be the case that traits are incorporated into varieties suited to other regions, such as India, South or Central America and China. "It'll just depend on the nature of what we discover. But if, for example, we gained a fundamental understanding of fertiliser use or increasing the efficiency of nitrogen use, this is the type of thing we could edit into perhaps all varieties of wheat."

The projects preceding Wheat Through the Ages have already proved that this type of research can help solve issues and answer questions. "Through the work on the Magic population, genome sequencing has helped resolve questions about resistances and different traits and how they're actually made," he says.

"And the Crop Wild Relatives project has been used to try and understand introgression. A lot of the ways traits are put into modern varieties is through breeding



*Breeders are already using marker assisted trait selection a lot, but mapped genomes are providing markers that are really closely associated with the trait they're after.*



*The 10+ Wheat Genomes Project helped pave the way for further research when it sequenced the genome of 16 wheat varieties from breeding programmes around the world.*

in resistance genes — typically biological resistance for a pathogen or an abiotic one to difficult environmental conditions. Some of this work has already been done, and we know the traits are there and roughly where they are on the chromosome but with the sequence of the progenitor, we can work out exactly the area of the chromosome, so how many megabases — millions of base pairs — have actually come in from this wild relative. If you know the gene you're after, you could possibly try to find varieties where the other bits of genes have been lost.

## Design markers

"There can be hundreds of genes in one area in that area, but might only be one or two you're interested in and the rest might be decreasing the agronomy of the plant. So we could use this work to design markers to swap the unwanted areas of chromosomes out for elite versions, for example," he details.

It'll be some time before the work of the Wheat Through the Ages project can be used by breeders but the path to it providing another tool is already outlined. "Breeders are already using marker assisted selection a lot, but the genomes are probably providing markers that are really closely associated with the trait they're after. Previously, the worry was that breeders were using a good marker, but it could still be a million base pairs away from where the gene is actually located.

"So at times the marker would indicate a good line, but when the variety goes into the field it becomes apparent that it doesn't have the trait it's supposed to have because there's a crossover between the

gene and the marker. So having the complete genomes and being able to pick a marker that's right on top of the trait is really useful."

Another aspect breeders have been able to advance is their understanding of how disease resistance works and how the genes involved can be stacked. But yields are more complex and it takes a long time to line up in a variety, as they aren't single dominance traits. Sometimes a small percentage gain from a gene will only work when it interacts with another gene, which can require an understanding of the whole network."

Whether the project unearths traits that can be bred into modern varieties or not, it's creating a useful resource for breeders, says Richard. "RAGT has genomic maps of our modern varieties but our insight isn't complete. However, if sequencing is being made from old varieties then we can do two things, the first is seeing the difference between ancient and modern wheats. And secondly, in certain cases, if we know the area of the genome in modern wheats which is involved in disease, yield or tolerances of various stresses we can predict what these are likely to be like if we grow them."

He points out that the industry can sometimes indicate that there has been a loss of diversity in plant breeding. "We talk about a loss of genetic diversity as a bad thing, but some of this is from attributes such as weak straw or excess height. Breeders live for diversity to be able to advance breeding. So any research project that gives us access to novel and useful diversity is a good thing that should be encouraged." ■

“The quality remains high with several exciting new additions.”

## AHDB Recommended List

# Ring the changes

It's that time of year again – Christmas is fast approaching and therefore AHDB releases the latest iteration of its Recommended List for cereals and oilseeds. CPM reviews the changes, including a BYDV-tolerant six-row hybrid winter barley and the first Group 1 winter wheat since 2017.

By Janine Adamson

It's another year where the additions to AHDB's Recommended List are select, making for a 'leaner and meaner' tool with shorter lists for most major crops. But as well as the obvious varietal adjustments, change has also been implemented to the RL itself.

According to Paul Gosling, who manages the RL at AHDB, the aim has been to make the information easier for users to understand and reflects findings discovered during the recent RL review. "The tables feature numerous improvements such as giving greater prominence to disease ratings and agronomic traits because these were voted as the most important features.

"We've also added more supporting information to the booklet to explain how the RL is compiled, including how trials are undertaken."

The RL app has been updated with a new feature which allows the side-by-side comparison of varieties, whereas the RL archive now has a tool to help users

identify the year when varieties were first and last listed.

Two calls for scoping reviews have been issued to examine evidence of varietal responses under lower-input scenarios (nitrogen and fungicides, respectively). However, Paul says where some recommendations from the RL review can be applied quickly, others will take longer or not be practical or affordable. "We're also looking at ways to maximise the value of RL data already collected to provide new insights," comments Paul.

But what about the here and now? Paul believes this year's leaner lists will be welcomed by many. "However, the quality remains high with several exciting new additions."

### Winter and spring wheat

Five new varieties join the winter wheat list, plus two additions for the spring. According to Paul, a stand-out is SY Cheer — the first provisional UKFM Group 1 variety since 2017.

He says it's a considerable step forward due to its much improved disease resistance — yellow rust (7) and brown rust (6) — which is reflected in the variety's untreated yield of 84%. "This'll be an attractive buffer for growers stretched with fungicide timings, which is where other Group 1s have struggled in the past," says Paul.

Baking quality test results have been good so far including gluten strength, and UKFM will confirm Group 1 classification in March 2024.

Syngenta's Kathryn Hamlen says Cheer provides a practical combination of high grain quality, high yields and robust foliar disease resistance. "We see it as a quality wheat made simple. It's an exciting variety," she says.

In terms of Group 3s, Bamford (Elsoms) and Almara (Senova) join the list. Paul says Bamford is a leap ahead in yield potential, matching up to the best of the Group 4 varieties. "However, without resistance to orange wheat blossom midge, this may prove disappointing for some."

Almara (Senova) is recommended for the North only, where it achieves good treated and untreated yields. Senova's Tom Yewbury says the variety should appeal to all end users of soft wheat. "As well as being suitable for distilling, it meets domestic and export requirements for biscuit wheat. That makes it an all-purpose wheat and ideal for the North."

The only new Group 4 soft variety joining the RL is Blackstone (Elsoms) which has strong disease resistance — septoria (6.2) and yellow rust (9), reflected in an untreated yield of 87%. The variety also boasts a favourable distilling report and high specific weight. ▶



According to Paul Gosling, the aim has been to make the RL information easier for users to understand.

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<sup>4</sup> Extern. Ecol. and Soil Sci. 2016, 2016, 11, 1104444

<sup>5</sup> J. Soil Sci. Soc. Am. 1960, 24, 1000-1005

<sup>6</sup> Bull. Eur. Assoc. Fish Pathol. 2016, 36, 1-10

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## New winter wheats in brief

Variety	Scope and type	Breeder/contact	Points to note
SY Cheer	Group 1	Syngenta	For UK with high hagsbergs and specific weight; good proteins for milling spec. Medium-tall with high resistance to yellow rust, mildew and fusarium ear blight.
Almara	Group 3	Senova	For the North with 'medium' distilling rating; very high yields on lighter soils. High yellow rust score plus OWBM resistance.
Bamford	Group 3	Elsoms Seeds	For UK with high specific weight; 'medium' distilling rating. Very high yields including early sowing. High septoria and yellow rust scores, <i>Pch1</i> eyespot resistance gene.
Blackstone	Soft Group 4	Elsoms Seeds	Soft milling feed for UK with 'medium' distilling rating. High yield potential in East and North including early sowing. High yellow rust, mildew and fusarium scores plus OWBM resistance.
LG Beowulf	Hard Group 4	Limagrain	Hard milling feed for UK; very high yielding including at early sowing. High septoria and yellow rust scores plus OWBM resistance. Stiff straw.

## New spring wheats in brief

Variety	Scope and type	Breeder/contact	Points to note
WPB Mylo	Group 2 (spring)	LSPB	High yields with high Hagbergs and good grain proteins. No major disease weaknesses – high yellow rust, septoria, mildew and brown rust scores.
SEW19-3003SW*	Group 4 (spring)	Cope Seeds & Grain	High yields with high Hagbergs and specific weights, and good grain proteins. No major disease weaknesses – high yellow rust, brown rust and mildew scores.

\*Will be added to the GB and NI Variety Lists in spring 2024, provided no representations are received.

## New winter OSRs in brief

Variety	Scope and type	Breeder/contact	Points to note
Dolphin	Hybrid	DSV	For East/West with very high GO. High stem canker score and resistant to TuYV. Very stiff.
LG Academic	Hybrid	Limagrain	For UK; very high GO in East/West and North. High LLS score and TuYV resistance. Pod shatter resistance, stiff at maturity.
LG Adeline*	Hybrid	Limagrain	For UK; very high GO in East/West and North. High LLS score and resistant to TuYV. Stiff with pod shatter resistance.
LG Armada	Hybrid	Limagrain	For UK; very high GO in East/West and North. High LLS score and resistant to TuYV. Stiff with pod shatter resistance.
Miraculix CL	Hybrid (Clearfield)	DSV	For the North with tolerance to imidazolinone herbicides. High stem canker score with TuYV resistance. Stiff with pod shatter resistance.
Pi Pinnacle	Conventional	Grainseed	Recommended for the UK with high GO for East/West. High LLS score but susceptible to stem canker. Very stiff.

\*Will be added to the GB and NI Variety Lists in spring 2024, provided no representations are received.

## New barleys in brief

Variety	Scope and type	Breeder/contact	Points to note
LG Capitol	Two-row feed	Limagrain	For UK with very high yields in the East and North, and on heavier soils. High yield potential in the West and on lighter soils. High brown rust score and resistant to common strains of barley mosaic viruses. High specific weight.
SY Buzzard	Six-row feed	Syngenta	For UK with BYDV tolerance. No major disease weaknesses with the highest net blotch score on the winter barley RL for 2024/25. Best relative performance in the East.
Belter	Spring	Agrii	High yielding recommended for UK; under test for both brewing and malt distilling. High yields with a high mildew score. Late maturing with high resistance to brackling.
Bounty*	Spring brewing	Agrovista	For UK with very high yields. High mildew and rhynchosporium scores but susceptible to brown rust. Late maturing with stiff straw.
LG Aquarius	Spring brewing	Limagrain	High yielding variety for the UK; very high yield potential in the East and high in the West. Good mildew score but susceptible to brown rust. Stiff straw.
NOS Gambit	Spring brewing	Senova	For UK with high yields; very high yield potential in the West and high in the East. Good mildew score and stiff straw.
NOS Munro	Spring malting	Senova	High yielding for the UK with good resistance to mildew. Late maturing with high resistance to brackling.
Olsen	Spring brewing & malting	Limagrain	For UK; under test for both brewing and malt distilling use with low specific weights. High yield potential in both the East and North. Good mildew score but susceptible to brown rust. Late maturing with stiff straw.

\*Will be added to the GB and NI Variety Lists in spring 2024, provided no representations are received.

## New oats in brief

Variety	Scope and type	Breeder/contact	Points to note
Asterion	Spring husked	Senova	For the UK; high mildew score with high yields. Moderate straw strength.
Ovation	Spring huskless (naked)	Senova	High specific weight for the UK. Early maturing with moderate straw strength.

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*SY Buzzard is the first six-row hybrid barley variety with tolerance to barley yellow dwarf virus..*

► Completing the winter wheat additions is Group 4 hard variety LG Beowulf (Limagrain), which Limagrain's Ron Granger says is much like LG Skyscraper, in that it 'performs wherever you grow it'. "It can be drilled early or late, providing growers with a wide drilling window as a first or second wheat, on light or heavy land, and there are very few varieties that meet this criterion," he says.

For spring wheat, the RL welcomes Group 2 WPB Mylo (LSPB) — a short variety with good disease resistance. SEW19-3003SW (Cope Seeds & Grain) also joins the list, which is a very high-yielding hard Group 4 variety. Neither appear to have significant disease weaknesses.

Winter wheat varieties no longer included are Elation, Elicit, KWS Firefly, KWS Guim, KWS Jackal, KWS Siskin, LG Prince, Merit, RGT Saki, Theodore and KWS Barrel. Spring wheat varieties making a departure are Hexham, KWS Chilham, KWS Giraffe and KWS Talisker.

## Winter and spring barley

Just two new varieties join the winter barley list — SY Buzzard (Syngenta), the first six-row hybrid with tolerance to barley yellow dwarf virus (BYDV), and LG Capitol (Limagrain), a two-row feed variety.

Paul says a highlight for him is Buzzard due to its BYDV resistance, which will be of interest to growers hoping to avoid insecticide use. The variety appears to have no disease weaknesses and has the highest net blotch score (7) on the winter barley RL for 2024/25.

Syngenta's Ben Urquhart says as well as BYDV tolerance, Buzzard maintains the other usual hybrid barley characteristics. "These include high and stable yield, good specific weight, suppression of certain grassweeds, early maturity and efficient utilisation of nitrogen fertiliser.

"It's also early to mature with a rating of -1. An early harvest can be important for farm cash flow and to provide a good entry for

winter oilseed rape," he explains.

In contrast, the spring barley list has six new additions, all under evaluation by the Malting Barley Committee (MBC) — three varieties for brewing only, two for brewing and malt distilling, and one for malt distilling only.

Also, because the list's layout has been improved, Paul explains it should be easier to understand how varieties are grouped and their malting status, whether that's having full approval or being under testing.

"Marketing-wise, we're seeing a greater focus on dual-purpose varieties which may influence grower choice," he says.

In terms of performance, Paul believes Bounty (Agrovista) is the standout addition, particularly in the East region with 107% treated yield. Disease resistance is also a strength with mildew (8) and rhynchosporium (7) scores, however the variety is susceptible to brown rust (4).

Although NOS Gambit (Senova) and LG Aquarius (Limagrain) are lower yielding than Bounty, they offer solid disease resistance. Both are under test for brewing only along with Bounty.

In the dual-purpose camp are Belter (Agrii) and Olsen (Limagrain) which are under test for both brewing and malt distilling while offering untreated yields above the current market leaders. Both score the same for mildew (8) and rhynchosporium (6), but Belter edges forward a notch when it comes to brown rust (5).

Completing the spring barley set is NOS Munro (Senova) which yields highly in the North at 103% (treated) and is under test for malt distilling only. It's a late maturing variety with high resistance to brackling (8).

Winter barley varieties no longer listed are Belmont, California, Funky, KWS Cassia, KWS Hawking and Surge, whereas spring barleys no longer included are Cadiz, Florence, KWS Curtis, Malvern, Prospect and Sun King.

## Winter oilseed rape

The most notable update to the winter oilseed rape list is the inclusion of verticillium stem stripe (formerly verticillium wilt) ratings. Paul explains this is in response to increasing incidences of the disease. "Although it's sporadic it's very hard to control with no registered fungicides. Varieties are rated as either susceptible (S), moderately resistant (MR) or intermediate (I)."

Ratings for phoma stem canker have also been 'reset' to correct a drift during recent years. "But this doesn't reflect a change in resistance status, rather an improvement in

the calculation process," stresses Paul.

The three new UK-recommended hybrid varieties joining the RL are LG Armada, LG Academic and LG Adeline (all Limagrain). Liam Wilkinson from the company says Armada is the first of Limagrain's seventh generation of hybrids, bringing new maintainer and restorer lines to their OSR portfolio.

"Ambassador-like' in its growth habit, Armada has strong autumn vigour, is robust, with good adaptability to all regions of the UK," he says.

Recommended for the East/West is hybrid variety Dolphin (DSV) which offers a high yield of 106% (treated). A stand-out feature is it's one of only seven varieties to be rated as 'moderately resistant' to verticillium, plus has a high score for stem canker (7).

For those seeking a UK-recommended conventional variety, Pi Pinnacle (Grainseed) has joined the list. The variety boasts a high light leaf spot score (7) but is susceptible to stem canker (4).

To conclude the additions, Miraculix CL (DSV) is on offer for the North region — a Clearfield variety with tolerance to imidazolinone herbicides. Miraculix CL has a high stem canker score (7) and pod shatter resistance.

On the OSR departure list – Crossfit, DK Expectation, DK Imprint CL, Flemming, LG Antigua, PT279CL, Respect and V 316 OL.

## Spring oats

The spring oats list features two new varieties — husked Asterion (Saaten Union) and naked oat Ovation (Senova). Asterion offers good treated (102%) and untreated (97%) yields, good disease resistance and high kernel content (73.2%). In contrast, Ovation is notable for its relatively high untreated yield (68%) and solid mildew score (6).

No longer listed are Aspen, Delfin and Kamil. There are no additions to the winter oats list. ■



*As well as being suitable for distilling, Almara meets domestic and export requirements for biscuit wheat.*



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“It’s important that RB209 reflects the mechanisms being used within practical farming scenarios.”

**AHDB**

*from theory  
to field*

# RB209: Going beyond gold

**RB209 has long been the cornerstone of crop nutrition guidance and an upcoming review intends to ensure it stays that way. While celebrating its golden anniversary, CPM investigates what the future might hold.**

*By Janine Adamson*

**Similar to a successful marriage, RB209 has involved strong foundations, a willingness to adapt to changes in the wider environment and working together with others to achieve specific goals.**

This year marked its golden anniversary — a time to reflect on the past 50 years and to look ahead to understand its place in crop production. As a result, AHDB is embarking on a review to ensure the Nutrient Management Guide (RB209) remains relevant for today’s farming systems.

“It’s quite an achievement for RB209 to be celebrating its 50th year, but neither farming nor nutrient management stand still so we’ve instigated a strategic review,” says AHDB’s Dr Amanda Bennett. “This involves gathering views from across all sectors on the technical content and guidance provided,

which will also be used to help direct research and knowledge-exchange and support nutrient management decisions.”

The pledge to continue to improve RB209 was made in the AHDB Cereals & Oilseeds sector plan (2022–2027). Chairing the RB209 review is AHDB Cereals & Oilseeds sector council member, David Bell. A mixed farmer from East Fife, David is also on the Recommended Lists (RL) review steering committee.

### Essential to our success

He says RB209 provides many farmers with the cornerstone of their crop nutrient planning. “We all strive to ensure we’re managing our farms in the most sustainable way we can, ensuring the guidance takes account of the latest science and understanding is essential to our success,” says David.

But where did RB209’s story begin? Although nutrient management research had been conducted for well over a century, officially speaking it was back in 1973 — this was when the Ministry of Agriculture, Fisheries and Food (MAFF) published the first comprehensive set of fertiliser recommendations for major crops in the UK, RB209 (Reference Bulletin 209).

Perhaps reflective of the time, the first few editions of RB209 in the 1970s emphasised artificial sources of nutrients and information on organic manures were relegated to a few

lines of text and one table.

During the MAFF and subsequent Defra eras, the environment was increasingly at the heart of the recommendations. Keen to reduce diffuse and point sources of pollution, the guidance emphasised the precise use of nitrogen and the final government-led (8th) edition was published in 2010.

Then, AHDB picked up the reins in 2015, working in partnership with government departments and other organisations to manage revisions to RB209. A review of the technical content was undertaken and AHDB launched its inaugural edition of the Nutrient Management Guide (RB209) in 2017.

“Revisions have been issued each year



*Amanda Bennett says because neither farming nor nutrient management stand still, AHDB has instigated a strategic review of RB209.*

## Timeline developments

2015: AHDB leads RB209
2017: First AHDB edition includes yield adjustments for nitrogen (for wheat and barley)
2019: First major update to sulphur recommendations since the mid-1990s
2020: The most significant revisions to phosphorus guidance since the 1980s
2021: Revised 'economic optima' (break-even-ratios) for nitrogen in response to high prices
2022: Overhauled recommendations for spring barley
2023: Golden-anniversary edition released
2024: RB209 reviewed

since. It might seem the same but there have been regular updates to ensure it remains relevant," explains Amanda.

Headlining the changes under AHDB's tenure were yield adjustments for nitrogen in wheat and barley, which enabled growers to tailor their inputs to match potential yields. In response to decreasing sulphur depositions, the 2019 edition updated the mid-1990s recommendations for the nutrient so applications would meet the requirements of modern, higher-yielding varieties.

But, research found major adjustments to the figures weren't required across the board. For example, in winter oilseed rape only a modest increase in sulphur was required, and it was also discovered that crops used sulphur from organic sources more efficiently than previously thought.

The most significant revisions to phosphorus management guidance since the 1980s occurred in the 2020 revision, with improvements to soil analyses, target indices and grain offtake values.

In 2021, RB209 entered uncharted territory and was updated with a facility for growers to calculate optimum nitrogen rates in response to soaring fertiliser prices. These 'economic optima' (break-even-ratios) pinpointed when the value of extra grain produced wasn't worth the cost of the extra nitrogen applied.

Subsequently, in the 2021-22 season, AHDB issued updated guidance and released the nitrogen fertiliser adjustment calculator for cereals and oilseeds.

### Distinct sections

And the changes continued — spring barley found itself in the spotlight last year, when recommendations were revised following an analysis of 15 years of trial data. It led to a boost to the crop's expected yield benchmark (from 5.5t/ha to 7t/ha) and new yield-adjustment guidance.

In its current guise, RB209 is split into seven distinct sections so users can identify relevant information and nutrient guidance



*The review presents an opportunity to give RB209 a make-over, not dissimilar to the recent Recommended List exercise that has been taking place, says David Bell.*

for individual crops, while updates that reflect the latest research can be easily incorporated in the publications. The guide is divided into principles of nutrient management and fertiliser use (1), organic materials (2), grass and forage crops (3), arable crops (4), potatoes (5), vegetables and bulbs (6), and fruits, vines and hops (7).

The golden anniversary edition was published earlier this year and featured a range of improvements, including changes to the recommendations for cereals.

Amanda says among these were notable adjustments to the recommendations for oats and key considerations for nitrogen management for milling wheat, an example being that nitrogen rates for oats are now based on expected yield.

"We work closely with many external parties and farmers who participate in the UK partnership for crop nutrient management group, with three sector technical working groups focused on the detailed science. Collectively, these groups inform, coordinate, and collate the data. Critically, they ensure that updates are evidence-based and independently reviewed." ►



*RB209 is celebrating its golden anniversary, having provided 50 years of nutrient management guidance.*

## The nutrient guide

With a passion for crop nutrition baseline, Oxfordshire arable farmer James Price says he's never without a copy of RB209. A member of the AHDB Cereals & Oilseeds board in 2015, which was when AHDB took ownership of the 'nutrient guide', James felt the move to bring the guidance 'in-house' was an opportunity to give farmers more influence.

According to James, nutrient management is the fundamental grounding to his farm business. Both he and his core team are FACTS qualified, which James believes helps them in their quest to build back

organic matter levels and tailor nutrients to crop requirements.

RB209 proved particularly valuable recently when they decided to add oats to the rotation. With little experience of the crop as a team (including the farm's agronomist), the updated information within RB209 gave them a baseline to work with and they didn't have to start from scratch to optimise their input strategy.

James says he'll continue to use RB209 and refine the approach to oats as his personal experience builds, flexing plans to meet the requirements of the site.





*Collaboration between growers and advisors is key, which includes following up on the sign-posts to further reading that are within RB209, says Alli Arden.*

► But what about the future? According to Amanda, section one — principles of nutrient management and fertiliser use — will remain the bedrock of RB209.

“Soil health plays an intrinsic role in nutrient management and it’s so important to understand how the two are connected. Section one, which includes the fundamentals of soil properties and nutrient supply, is the foundation of the guide,” she explains.

“It’s then how you stack on top of those fundamentals — the next layer being organic materials, and finally synthetic inputs. Soil health should always underpin it all.”

Amanda says current farming systems look very different to those of the 1970s, and although some pressures remain, growers have wider aspects to consider such as their contribution to net zero.

“Everyone is under pressure to reduce their synthetic input use, whether that’s to make efficiencies, or to improve their sustainability credentials. There’s a greater focus on understanding the carbon footprint of production systems — something which has come under scrutiny of late,” she says.

“But then for arable farmers pursuing a regenerative approach, what’s the impact of integrating livestock into the rotation or cover

cropping? How does this affect nutrient management and a following crop’s requirements? Or what happens for biomass or energy crops?

“This is why we’re assessing the scope of RB209, what it means for today’s farmers, and how to support these emerging strands which are being embraced by businesses.”

Agronomist Alli Arden chairs the AHDB’s arable technical working group for RB209. She agrees that as well as being challenging, times have indeed moved on.

## Use all tools

“There are so many goals to achieve as an industry, we have to use all of the tools that are available to us. At the same time, product innovation is developing at a rapid pace, from biostimulants to urease inhibitors.

“It’s important that RB209 echoes that pace of change and reflects the mechanisms being used within practical farming scenarios,” she says.

Amanda anticipates the review will ensure that industry guidance on nutrient management remains relevant to current and future farming systems. Critical to this, she says, is having buy-in at an individual farm level.

“On-farm interpretation is integral to good nutrient management. There’s no one-size-fits-all, RB209 has to work alongside each individual farm and people who know the site inside-out. You can’t replace that knowledge,” says Amanda.

This is a sentiment echoed by Alli. “Much evidence goes into the guidance, it’s a starting point to work from and acts as a reference document. However, because it’s a distilled tool, it doesn’t have all of the answers for every crop.

“Collaboration between growers and advisors is key — this includes following up on the sign-posts to further reading that are within the guide, rather than simply executing a figure from a table,” she says.

David says the review presents a great opportunity to give the guidance a

make-over, not dissimilar to the recent RL exercise that has been taking place. “It’s important that RB209 is updated to represent the most current research and understanding, to empower growers with the knowledge they require to grow crops in challenging environments.

“There remains a lot that we don’t know about soils and the interactions that happen below ground, including those between nutrients and plants. But what we have learnt of late should be integrated into the guidance to reflect modern understanding,” says David.

He believes more levy payer input into this specific aspect of AHDB’s work will deliver even more value for farmers. “Appropriate governance is critical in ensuring money is invested wisely and we should be listening to levy payers to deliver what they truly require,” stresses David.

“We’re learning a lot from the RL review which can hopefully be applied to influence the process for RB209 to ensure it runs as smoothly as possible.”

According to Alli, AHDB is ideally positioned to maintain ownership of the guidance. “What AHDB offers is a controlled framework to deliver both the review activity and future iterations of RB209. Since it took over, the guide has become a ‘living document’ and a collaborative effort.”

Scoping beyond this, as well as the actual guide, the data from RB209 is used across a number of commercial digital products and APIs (Application Programming Interfaces). David would like greater recognition of this contribution.

“You could say that as farmers, we don’t always realise we’re using RB209 information because it’s fed into a product behind the scenes. I’d like this input to be highlighted so that levy payers aren’t paying twice for the same data, essentially improve the regulation around RB209’s commercial use moving forward,” he says. “It belongs to the AHDB and therefore belongs to levy payers,” he concludes. ■

## Be involved

Agronomist and chair of the AHDB’s arable technical working group for RB209, Alli Arden, says it’s ‘incredible’ that RB209 has survived for 50 years, which is why the review will play an integral role in futureproofing its existence.

“Some may criticise the recommendations in RB209 because they don’t offer all of the answers, but there’s little point voicing such critique if it’s not shared as feedback. This is the number one opportunity for farmers to be

involved and help to steer positive change,” stresses Alli.

Levy payers wishing to contribute initial ideas and suggestions for the development of RB209 can email: [nutrient.management@ahdb.org.uk](mailto:nutrient.management@ahdb.org.uk) with ‘RB209 Strategic Review’ in the subject header.

Contributions received before 1 January 2024 will be considered as part of the initial phase of the review process.

## Research roundup

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

For more detail about the project, visit [ahdb.org.uk/rb209](http://ahdb.org.uk/rb209)



## Spring cropping

# Spring saviours?

**With wet weather hammering autumn-sown crops and ground travel remaining limited, spring planting may seem more appealing than ever. CPM looks at different options.**

**By Janine Adamson and Rob Jones**

**The Met Office first started naming storms in 2014 in a bid to increase public awareness of how dangerous they can be. Babet, Ciarán and Debi have battered UK shores recently, the results of which are being felt acutely by growers nationwide.**

But a friendly moniker certainly doesn't make dealing with the fall-out any easier — many autumn cereal crops have been saturated and flooding is commonplace.

For those with no choice but to write crops off and wait until the spring, Senova's Tom Yewbrey says oats could be a viable option for more than one reason. "Spring oats have been slowly gaining popularity and recent autumn difficulties could subsequently make for a positive year for the crop.

"Margin-wise, they're reasonably low input (100-130kgN/ha) because they're good at scavenging for nutrients. There's

also been an increase in end user demand due to the health benefits," he says.

Tom advises that planting is reasonably flexible and should take place from the end of February into March. "A watch-out is dry spring conditions during establishment, which we've struggled with in recent years. That's because oats prefer a moist seedbed, meaning they also don't perform particularly well in very light soils."

### Spring oats

Bedfordshire farmer Matt Fuller supports integrating spring oats into the rotation. He's been growing the crop for three years as a means of spreading the risk at his 1000ha farm and is happy with the result. "We were growing around 300ha of oilseed rape as a break crop but found it very hit and miss, hence we had to find something different to add rotational variety.

"Also, wet autumn conditions have reduced the amount of winter wheat being grown which has a knock-on effect on the availability of spring wheat and spring barley seed. This meant we had to explore alternative options such as oats and peas," he explains.

Having grown the crop for several seasons, last year opting for WPB Isabel from KWS, Matt says he's noticed a beneficial legacy effect. "We've had very good first wheats after spring oats, I think that's due to improved rooting and soil health. Wheat seems to be energised after cropping oats."

**“ We've had very good first wheats after spring oats, I think that's due to the improved rooting and soil health.”**

However, he warns that grassweeds such as brome can prove an issue. "Grassweed herbicide options are limited in spring crops and meadow brome, for ▶



*Tom Yewbrey says spring oats could be a viable cropping option for more than one reason.*



Matt Fuller has been growing spring oats for three years as a means of spreading the risk at his farm in Bedfordshire.

► example, can unfortunately germinate in the spring.”

Matt also says avoiding stress in spring oats is key, and that application of PGR ‘little and often’ rather than one large hit, helps to keep the crop standing ahead of harvest.

For those preferring to stick with a more conventional option, spring barley reigns supreme. Laura Beaty from McCreath Simpson & Prentice (MSP) says Firefoxx (Elsoms-Ackermann) in particular is gaining momentum across the North.

As a result, the company has been following the variety closely since it first

appeared in National List trials, now one year on from approval for malt distilling use. “Since gaining full distilling approval, Firefoxx is on an upward trajectory — we’ve seen demand for seed double during the past three seasons,” says Laura.

She explains that in terms of parentage, Firefoxx is a Chanson/Acorn cross and importantly, isn’t directly related to Laureate, therefore it offers a different genetic background and adds diversity into the spring barley market.

“During a very challenging 2023 growing season in Scotland, where a ►

## Spring barley farm trial insights

Huntingdonshire farmer David Felce of Midloe Grange Farm says he has no fixed view of how crops should be grown but is instead determined to use the land for what suits it best.

“I know which are my productive areas and those that’ll struggle eight years out of 10 to produce a respectable crop. Perhaps conveniently for me, the less productive areas tend to be better suited to wildlife measures,” says David.

Across the 97ha of clay loam soils (Hanslope series), he admits yields are respectable, but rarely exceptional. As a result, his intention is to maximise output while practicing tight cost control.

“I have clearly defined objectives — grow crops in an appropriate way to minimise risk and maximise output while preserving and promoting the wildlife habitats we have.”

As such, David has watched with interest as direct drilling has come back into vogue under the regenerative agriculture movement. He says like many others, he’s been around long enough to remember why it went out of fashion.

“There are many who seek to proselytise the benefits of regen ag but the data to support such claims is worryingly scarce. As a business reliant on contractors for most of my operations, the opportunity to cut costs and potentially improve my soils through a regen approach held great appeal, so I decided to take a closer look,” he explains.

Drawing on skills honed in his role as regional technical adviser for Agrii, David devised a multi-year trial using spring barley. It involved comparing the yield following establishment after autumn ploughing with that of spring strip-tillage following an autumn-sown cover crop mix. Soil samples were taken from the crop after ploughing and the cover crop for analysis.

“Depending on the objective, the trial was either an overwhelming endorsement of reduced tillage practices or proof that nothing beats the

plough. This is because yield, and therefore the financial margin over establishment costs, was significantly better where the crop was sown after ploughing.

“If the difference between the systems was modest in year one, it was a chasm in year two, with a 2.7t/ha difference. No matter the savings in metal and diesel, yield is king, inexorably so, if you want to maximise your financial return,” says David.

Conversely, in support of direct drilling, David says he understands the message that by staying the course, yields will improve once the soil is ‘healthy’. “To be fair, the soil following the cover crop had shown improvement.

“The ploughed land was in good condition with a respectable score of 76 out of 100, but the soil under the cover crop showed an improvement on every aspect, yet this only moved the overall score to 79.

“Perhaps most impressive was the improvement in water infiltration rates from 21.8mm/hr after ploughing to 55.1mm/hr after two years of a cover crop, but what value should we ascribe to this?” questions David.

Having satisfied himself that in this scenario, deep cultivations offer the best means of maximising yields, David’s attention turned to variety selection, looking particularly at those with the prospect of securing a market premium (see table).

“Crusoe, KWS Extase and KWS Palladium all



Depending on the objective, the trial was either an overwhelming endorsement of reduced tillage practices or proof that nothing beats the plough, says David Felce.

impressed but the standout was Skyway, a spring barley with full approval for brewing. It comfortably met grain nitrogen requirements and at 8.9t/ha, delivered an excellent return for a modest spend.

“Successful cultivation also means no residual herbicide is used, improving gross margin and reducing pesticide loading. It’s less susceptible to brackling than Explorer and offers a useful opportunity to keep on top of grassweeds ahead of sowing; I’ll be growing it again in 2024,” concludes David.

### Midloe Grange Farm: Harvest 2023 performance

Variety	Yield (t/ha)	Grain protein/nitrogen (%)	Specific weight (kg/hl)
Crusoe	9.0	13	82
KWS Extase	10.0	12	78
KWS Palladium	9.75	12.5	78
Skyway	8.9	1.54	70

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Since gaining full distilling approval, Firefoxx is on an upward trajectory, says Laura Beaty.

► significant percentage of spring barley was drilled a month later than it should, on-farm reports show that Firefoxx has proven its resilience with specific weights, yields and grain quality all holding up well.

"Many growers have confirmed that it was harvested up to seven days earlier than competitor varieties, enabling them to spread their harvest window," comments Laura. "For malt distillers, its grain quality, low screening levels and observed key trait of being less prone to skinning are among its benefits."

## Grain quality

Furthermore, Sarah Lugget of Simpsons Malt says the logistical benefits of an early maturing variety such as Firefoxx are significant. "However, the grain quality has to be there for the end user as well, and there's little doubt this variety is appealing to distillers.

"It's clearly gaining traction among growers so the only argument would be that, as a single-use variety, it may lack the scope of a dual-purpose competitor. That said, it's a new variety on the Malting Barley Committee (MBC) list, so it would be wrong to dismiss its long-term

potential based on that single criterion," says Sarah.

The recent inclement weather may seem like déjà vu for Alan Steven of Hillhead Farm near St Andrews in Fife. Last year his rotation included spring and winter barley, winter wheat and niche crops such as parsnips and brussels sprouts.

Drilled on a variety of light and heavy soils between 5-10 April Alan says Firefoxx started well. "The crop showed good early vigour and competed well against our main weed burden of annual meadowgrass, chickweed and speedwell. It remained clean through late spring and summer, overcoming both an extended dry spell and then a serious amount of heavy rain, even for this part of the world," he says.

"We harvested between 25 August and 4 September, achieving average yields of 6.8t/ha with bushel weights of 69kg/hl and low screenings at 2.2%. Importantly, all

## Tips for spring barley selection

With a wide range of different varieties to choose from, offering attractive yields, lower growing costs and a premium potential, spring barley selection could prove daunting.

But, whether the decision to grow the crop is planned or unplanned, Limagrains UK's Ron Granger says there are key considerations to bear in mind.

### Market requirements

Start by fully understanding your grain buyer's requirements in terms of variety and grain quality, especially when looking to supply premium brewing or distilling markets, says Ron.

"In some instances, contract specifications dictate the variety that must be grown, and criteria such as grain nitrogen content will have an important impact on agronomic decisions and crop inputs throughout the season.

"This is particularly true for those dependent on hitting a certain grain nitrogen percentage to achieve the contract premium, notably distilling, which requires 1.65% N or lower, brewing 1.65-1.85%, and grain distilling at 1.85%+. Grain nitrogen is not a concern for animal feed," he explains.

### Dual-use potential

Where variety choice isn't dictated by the end user, Ron says growers have more flexibility. With 13 malting and four feed varieties on the 2023/24 AHDB Recommended List, there's a good

selection available, but Ron recommends considering a dual-use variety such as LG Diablo.

"Dual-use varieties offer growers flexibility to grow for more than one market, whether that's distilling, brewing, or feed market sectors," he says.

### Vigour and tillering capacity

According to Ron, newer varieties, such as LG Diablo, also offer spring vigour and high tillering capacity, which are valuable traits in the crop given the relatively short growing period.

"The best way to maximise spring barley yield potential is to ensure high final ear counts. The AHDB barley growth guide suggests the final target ear population should be around 775 ears/m<sup>2</sup>, but even higher final ear counts may be required to drive yield.

"An 8-9 t/ha crop requires around 800 ears/m<sup>2</sup>, which at a 350 seeds/m<sup>2</sup> rate, equates to around 2.5-3 tillers per plant at harvest," he explains.

### Disease resistance

Strong disease resistance is an important characteristic to look for in any variety, and spring barley is no exception with mildew, rhynchosporium, and brown rust being the main considerations, says Ron.

"Early drilling can significantly increase disease risk, so it may be important to consider more disease resistant varieties for this situation. Spring barley doesn't have a



Although a wide range of options are available, Ron Granger recommends considering a dual-use variety.

main yield-building flag leaf, so all leaves, including leaves two and three, must be kept clean and green as long as possible."

### Resistance to lodging/brackling

"Choosing a variety with good straw characteristics is key to protecting yield and grain quality at harvest, and potentially offers another output from the crop, be it for your own use, or for sale," explains Ron.

"However, while a variety's RL ratings for lodging and brackling provide a useful indication, it's also important to recognise the role of agronomic decisions, notably around seed rate, nutrition, and the use/timing of growth regulators," he concludes.





*As a Chanson/Acorn cross, Firefoxx isn't directly related to Laureate and therefore adds diversity into the spring barley market.*

of the Firefoxx crop met the distilling specification and given the adverse weather, we were obviously very pleased. Agronomically, it's an early variety, which helps to spread the risk at harvest and keep the combines moving."

But what about those planning to stick with winter cereals, which in theory, can

be drilled until January; is there hope? Timac Agro UK's Adam Bartowski warns that there'll always be the risk of reduced germination and plant populations.

## Establishment rates

"If crops are drilled after November, the average establishment rates tend to fall below 50%. The AHDB wheat growth guide also indicates that between sowing and emergence, a total soil temperature of 150°C should be reached, which can take up to a month in late crops drilled into cold, wet soils," he explains.

Furthermore, Adam says that wet soils not only run the risk of hard freezing as temperatures drop, but they can also induce a stress response in plants. "This leads to elevated ethylene levels from poor ventilation, causing crops to mature too early or shut down entirely.

"If growers are still looking to capitalise on winter wheat, the best approach to encourage establishment is to combine increasing seed rates with applying a soil conditioner or starter fertiliser.

"An example being Physiostart — a microgranular starter fertiliser which can be added with the seed at drilling. It contains phosphorous and zinc to



*Despite inclement weather conditions last season, Alan Steven says all of his Firefoxx crop met the specification for distilling.*

stimulate germination, early root growth and nutrient uptake where there's been less natural microbial activity to provide soil nutrition."

For those without the specialist equipment required for this, Adam says another option is to apply a soil conditioner in preparing the seedbed just before drilling. ■

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## Innovation Insight

# Grand slam

**Achieving the highest yielding variety of the year is a bit like topping the music charts of the plant breeding world, but what does it take to do this across four different crops? CPM takes a closer look at this year's headline varieties.**

*By Melanie Jenkins*

**With the release of the 2024/25 AHDB Recommended List, Limagrain has taken its second clean sweep in a row with the top yielding varieties across wheat, barley and oilseed rape.**

Additionally, with the publication of the British Society of Plant Breeders 2024 Forage Maize Descriptive List in September, the company has the highest yielding early maturing maize variety, but how has the breeder achieved this feat?

According to Limagrain's Martin Titley, the starting point is significant investment. "We normally invest about 14-15% of our turnover into our plant breeding programmes across the UK and Europe

and this gives us the resource to develop effective breeding programmes."

Further to this, the company has UK based breeding programmes for wheat, barley and OSR. "This ensures that the breeding work done in the UK means the programme produces varieties that are suited to the conditions farmers have to deal with here," he explains.

### Genetic markers

"Our UK wheat varieties are bred at Woolpit, Bury St Edmunds in Suffolk, while barley and OSR are bred at Rothwell in Lincolnshire, and we feel that we might not have had the success we've had if these varieties hadn't been bred here."

Another element is the use of genetic markers in plant breeding, which is not limited to Limagrain, explains Martin. "It's not just yield markers that have been identified, but others such as the yellow rust gene which provides strong resistance to the disease, plus orange wheat blossom midge (OWBM). And through genomic selection other traits such as lodging resistance, and varieties with higher specific weights, have also been identified.

"In OSR we've identified turnip yellows virus (TuYV) and pod shatter resistant genes, both of which have been fundamental to helping improve yield, but especially the latter because it

*“What breeders can achieve through genetics and breeding is only going to become more vital.”*



*According to Martin Titley, Limagrain normally invests about 14-15% of its turnover into its plant breeding programmes across the UK and Europe.*

## LG Caravelle

For the second year running, LG Caravelle has topped the winter barley RL, yielding 105.6% coming in 0.1% ahead of its sister variety, LG Capitol. “Caravelle is still the highest yielding two-row feed barley, demonstrating good all round disease resistance, with a very high specific weight,” explains Limagrain’s Ron Granger.

The variety scores 7 for both mildew and brown rust, while it’s rated 6 against net blotch and rhynchosporium. “Caravelle has good grain quality, with a high specific weight of 71.4kg/hl and low screenings at 1.7% through a <2.25mm sieve.”

It also has good straw strength combined with good brackling resistance with an earlier maturity (0) “It’s a variety that delivers the range of agronomic characteristics thought desirable by growers on farm,” he says.

According to Ron, the winter barley feed market is a competitive space, so it was

essential to produce a variety that could perform across all regions and seasons, while continuing to deliver its agronomic package. “Historically, if we look back at varieties like LG Mountain, added to the list in 2019, there’s been a huge improvement in terms of agronomics, both in two-rows and hybrid varieties. We’re seeing better disease resistance, improved grain quality, better straw attributes with significant increased yield and the older varieties just do not compete with what’s available now.”

Additionally, Caravelle has been shown to work well in blackgrass situations, he points out. “Although it’s usually hybrids that are associated with this, Caravelle is higher tillering and based on external trials, we’ve seen it compete with blackgrass well.

“It’s always hybrids which have been perceived as having the highest yield potential, but we’re now seeing two-rows up to this level,



*For the second year running, LG Caravelle has topped the winter barley AHDB Recommended List, yielding 105.6%.*

with better all-round agronomics and with more genetics in the pipeline, its exciting times,” he concludes.

means the pods stay intact and retain seed longer.

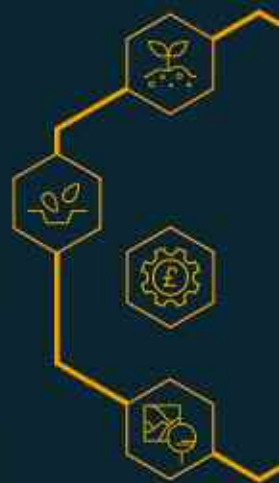
Moving forward, genetic solutions will be a vital solution for helping farmers in

the long term as the regulation of the current chemical use becomes more restrictive, highlights Martin. “What breeders can achieve through genetics

and breeding is only going to become more vital and we’ll have to produce varieties that continue to bring improved resistance and higher yields to the table.” ■

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## LG Armada

Taking the top spot on the OSR RL, LG Armada has sailed passed the competition with a gross output of 106.5%. The variety is one of a new generation of varieties from Limagrain, which also includes Academic (106.4%) and Adeline (106.3%).



*Armada is one of Limagrain's seventh generation of hybrids which bring new maintainer and restorer lines to the table.*

"These are our seventh generation of hybrids and for the first time in a while, they bring new maintainer and restorer lines to the table which have allowed us to produce a stacked portfolio of stem health attributes," explains the firm's Liam Wilkinson.

Stem health is a key part of Limagrain's drive to secure yield on farm, he says. "Having strong stem health has allowed Armada to produce consistent performances across the UK. While having pod shatter and cylindrosporum — stem based light leaf spot — resistance provides on-farm security in all situations and across regions. And as stem health has improved, we're seeing bigger stems and better rooting which results in higher oil content - Armada and the other varieties in the seventh generation have all demonstrated increased oils compared with our past portfolio."

Although it was bred in the UK, Armada has been tested in Europe and because of its performance has been highlighted for use in some continental countries, says Liam. "It's performed and been consistent across versatile settings, so



*Stem health is a key part of Limagrain's drive to secure yield on farm, says Liam Wilkinson.*

we knew at the pre-National List stage that it would be a good fit across the board.

"Even at the early stages of its path to commercial launch, Armada was getting a lot of interest from the trade and has garnered the attention of farmers," says Liam. "It's been one of our biggest launches of a pre-recommended variety for a long time and we had seed commercially available for sowing this year."

## LG Beowulf

The highest yielding wheat variety on the latest RL, LG Beowulf clocks in at 106.2%. Although there are three other varieties on the RL sitting in the 106% window, Beowulf has a yield advantage of 0.5%, giving it top spot, explains Limagrain's Ron Granger.

"The variety is a hard feed wheat and although Limagrain has dabbled with hard feed wheats in the past, historically the majority of our programme was based around soft wheat. Limagrain is now exploring a different territory with the hard feed sector, so this is a new adventure for us," he says.

In addition to the variety's headline yield, Beowulf brings with it many of the desirable agronomic characteristics thought of as high importance by growers, according to Ron. "The variety has stiff straw, rated 8 for standing, both with and without a PGR, and has a good specific weight at 78.3 kg/hl, as well as OWBM resistance. It's great to have OWBM resistance because although it's not talked about a lot, it can impact yield in some seasons, especially in the South East. Beowulf also has a secure disease resistance profile with scores of 9 for yellow rust resistance and 6.7 against septoria."

A major element in producing wheat varieties such as Beowulf came down to not just looking at yield during the breeding process but trying to create varieties with resilience that cope well

across different seasons, he explains. "The past few seasons have been very different, but we've seen consistent results in the trials during this time which gives growers confidence in a variety.

"Beowulf has also shown good consistency across all regions as well, including Scotland where it has performed well. The variety can be grown as a first and a second wheat, on light or heavy land and in early to late drilling slots," says Ron. "It's shown high yield potential across the early and through to the late drilling window, allowing for drilling date flexibility on farm while maintaining high yield performance. We've also seen the variety perform very well with commercial rates of fungicide in both internal and independent agronomy trials."

So where has Beowulf inherited its performance from? "One of its parents is Gleam, which has been a very successful variety on farm bringing with it a security of performance around yield and a good agronomic package with a high specific weight. Gleam may not be the highest yielder now, but it's a robust variety that has consistently performed in wet and dry seasons. Beowulf's other parent, Costello, although perceived lower yielding and known as a safe variety, contributes stiff straw, good disease resistance and a respectable specific weight," he explains.

"Going back 15-20 years, varieties would



*The industry requires high yields and grain security, and robust varieties are Limagrain's aim going forward, explains Ron Granger.*

perform one year and not the next and this is something breeders have all worked hard to overcome," says Ron. "Although Limagrain isn't known for its hard feed wheats, we wanted to produce a variety that ticked all the boxes in terms of agronomics, disease resistance, grain quality and yield to help growers manage the current challenges they face. Whether that's the changing agricultural environment, the increasing use of integrated pest management on farm, or reducing costs, the key to all of these elements will be producing suitable varieties. The industry requires high yields and grain security, and robust varieties are the aim going forward."

## Innovation Insight

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



## Saxon

Limagrain's maize variety, Saxon, was added to the BSPB 2023 Forage Maize Descriptive List, but has again topped the list for early varieties in 2024 with dry matter yields of 19.1t/ha, says the firm's Tim Richmond. "On the Descriptive List, Saxon yields 105.2% of the controls, which is very high for an early variety with an FAO of 180.

"We've been working to develop a high yielding variety with a good feed value that is suited to an early harvest, and Saxon fits these criteria," he explains. "Of all varieties on the list, no other varieties are both as high yielding and as earlier to mature than Saxon, meaning farmers can have the reassurance of a safe and early harvest alongside yield expectation."

Another element the breeding team worked to bring to the variety was good digestibility, according to Tim. "Half of the dry matter yield of every plant is from the cob and starch which is 100% digestible, but the other half is made up of leaves and the stem, and the digestibility of these latter parts can range from 50-60%. In Saxon, the leaves and



*Based on two years of private and a further two years of National List trials, followed by testing with BSPB and NIAB, Saxon came through very strongly as a UK variety, explains Tim Richmond.*

stem are 59% digestible, which means that for every kg of silage produced, it has a higher ME content that also contributes to the total ME yield/ha grown. Saxon has the highest ME yield of all varieties available at 224,682MJ/ha at harvest."

So how did Saxon make its way to a UK commercial situation? "All maize varieties are bred on the continent initially, and a few years ago the team discovered a new cross that looked promising through the primary phase of parent inbred lines," explains Tim. "Once we developed this into a new hybrid line, we could test it in the UK and we really saw the potential of Saxon.

"Based on two years of independent and a further two years of National List trials, followed by testing with BSPB and NIAB, Saxon came through very strongly as a UK variety," explains Tim. "The variety is now in its second commercial year and agronomically has stood up well, while being a good all round performer."



*Half of the dry matter yield of every plant is from the cob and starch which is 100% digestible, but the other half is made up of leaves and the stem, and the digestibility of these latter parts can range from 50-60%.*



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## Pulse Progress

Having addressed substantial energy costs across its poultry and arable enterprises, Woodend Farm in Berwickshire is looking to home-grown pulses to reduce reliance on imported soya. CPM visits to get an insight.

By Rob Jones

**There are still one or two flowers bracing themselves against the early November weather in John Seed's margins that surround his field of cover crops and edge a new woodland planting that slopes down to a burn.**

"We used to farm right up to the edge of that burn, but it made sense to take this bank out of production," he notes. "The way we farm now is far more resilient and sustainable. It benefits the environment and communities, but it benefits our business, too."

You can tell from the tone of John's voice and the conviction with which he speaks that his views are not based on ideology nor political affiliation. Everywhere you look at Woodend Farm, near Duns in the Scottish Borders, are signs that these have been

followed through with substantial and measured changes that have set the farm on a course to net zero and improved profitability.

There's a 75kW solar array on the roof of the poultry unit that houses the 32,000-bird laying flock of the farm's free-range egg business. In the range in front is another 25kW array for the cottages, and there are plans to expand this.

### Biomass boiler

Heating Woodend's farmhouse, cottages and poultry unit on a district heating system and drying the grain is a vast 950kW multi-fuel biomass boiler that takes in large round straw bales to heat a 100t hot water accumulator.

Set aside from the buildings is a 75kW Halus V17 wind turbine. "We bought it second hand, so it's already 43 years old, but generates about 140kWh of electricity per year."

John used to work in the renewables industry before he returned to the 214ha farming partnership he runs with wife Louise and son Donald. It was there he acquired an acute awareness of the effects of global warming.

"The thing that drives me is climate change," he says. "When I started in the renewables industry in the mid-90s it was already accepted that global CO<sub>2</sub> emissions were far too high, yet they're still going up. The elephant in the room for agriculture is nitrous oxide, coming from

*“Home-sourced protein is what we grow and it's what the nation needs.”*

fertiliser use that itself is generated from fossil fuels."

The other side of this is the cost, he notes. Woodend Farm used to spend



*John Seed is seeking to reduce reliance on imported feed, and in particular looking to the value of home-grown protein.*

£125,000/yr on fuel and electricity before the farm implemented its own renewables enterprises — “It’s dead money, and these are costs my grandfather never had to find when he farmed this land,” says John.

On the arable side of the business, there’s been a similar focus on costs and energy reduction across the 178ha of Grade 3 arable land that lies at the edge of the fertile Merse of Berwickshire, just before it rises up to meet the Lammermuir Hills. “This is the first year we’ve



*Purchased feed – largely in the form of soya – is responsible for 82% of the farm’s entire GHG emissions.*

established everything without the plough,” states John, entering one of his sheds.

He gestures towards the now-redundant implement that’s gathering dust on last year’s coating of oil.

## Reduce imports

This sits beside a Lemken Solitair 8 power-harrow combination drill. “We used this mostly for establishing cover crops this year. We’ve tried a range of drills, and it’s a neighbour’s Horsch Avatar that’s brought the best results — we have stones the size of rugby balls, and it’s the only one that doesn’t bring them up,” he notes.

But it’s the heap of beans we’ve come to see. John scoops up a handful and inspects the sample. “Our focus now is to reduce our reliance on imported feed, and in particular we’re looking to home-grown protein.”

The poultry enterprise started in 2009, and while previously all feed was bought in, they’ve now switched to selling their eggs through Glenrath Farms, which allows Woodend more flexibility to use its own crops as feed. Currently 55% is home-grown — mainly cereals — but 17% of the diet is bought-in soya while 10% is sunflowers.

The farm has monitored its carbon balance since 2016, and linked to



*Beans could play a critical role in helping John to move away from soybean in the diets of his 32,000-bird laying flock.*

deforestation, imported soya carries a high carbon cost — purchased feed is responsible for 82% of the farm’s entire GHG emissions. But it’s the economics that really channels John’s determination to drive down the soya inclusion. “It’s trading at £508/t, with soya oil at £1400/t. Sunflowers cost us £440/t.”

In terms of protein levels, soya is the best source at 41%, while beans are the highest home-grown source at 25%. John notes that switching out one tonne of soya for two of beans would still be a saving, ▶

## Pulse quickens as pioneers sign up

John is one of 200 farmers who have joined PulsePEP, the farmer-led community at the heart of the Nitrogen Climate Smart (NCS) project, which was launched in June this year.

Reducing GHG emissions by 1.5Mt CO<sub>2</sub>e per annum (or 54% of the maximum potential for UK agriculture) is the primary goal of the project, which could be achieved by replacing half the imported soya used in livestock feeding rations with home-grown pulses.

Led by PGRO, the £5.9M Defra-funded project hinges on the consortium of 18 partners and a network of farmers who will carry out trials over the next three growing seasons.

There are a number of ways to get involved with the project:

1. **Join PulsePEP** — think of it as a farmer-led information exchange on all aspects of growing and feeding pulses with science at its core. PulsePEP was launched at CropTec last month and brings together a knowledge hub, hosted by ADAS’ FarmPEP, and a discussion forum, hosted on The Farming Forum and moderated by the British On-Farm Innovation Network (BOFIN).

2. **Establish your carbon baseline** — help and support is available from Farm Carbon Toolkit, with the aim to get 200 farmers on board and their carbon balance monitored through the duration of the project. The data feeds into the life cycle analysis being prepared by the James Hutton Institute to give an accurate picture of the impact of pulses across the rotation.

3. **Become a Pulse Pioneer** — BOFIN is recruiting up to 40 farmers who will be paid to carry out on-farm trials throughout the course of the project. Growers must commit to growing a pulse crop for each year of the project, enter crops into ADAS YEN to get detailed analysis of their performance, and closely monitor crops, particularly soil nitrogen levels.

Having established the farm’s carbon baseline, John has also applied to become a Pulse Pioneer. “I want to ensure the project meets the unique demands and nuances of our farm, especially since we already have a dual enterprise model of eggs and arable crops,” he says.

He has some specific questions he’s looking for the project to answer, including:



1. How will the introduction of field beans affect the existing soil quality and structure on the farm?
2. Will legume rotation systems require additional interventions such as tillage or specific pest management?
3. What are the nutritional differences between field beans and imported soya, particularly for free-range hens?
4. How will the change in feed impact egg quality, if at all?
5. Are there pilot farms to visit to see the impact of this change in livestock feed?
6. How does replacing imported soya with home-grown protein like field beans affect overall operational costs?
7. Are there market studies to suggest the commercial competitiveness of this shift?

For more information, visit [nscproject.co.uk](https://nscproject.co.uk)



*Winter and spring-sown beans provide the main breaks in a rotation that includes winter wheat, spring barley and spring oats.*

▶ with beans trading at £180/t.

But the equation isn't that simple. The feed ration is carefully balanced to sustain the 31,000 eggs/day the laying flock produces. "Hens are like athletes — they're managed and fed to perform at peak ability. The more you learn about their diet, the more you realise how much there is to know. It's a science and you can't afford to experiment and make mistakes — if they go off laying because of a change in their feed it can cost you hundreds of thousands in lost revenue."

Layered into this is the need to maintain the correct type of protein — soybeans are a good source of methionine and lysine, two essential amino acids in the poultry diet that contribute towards flock health as well as egg size and quality. In addition, John is looking to improve the resilience of the flock.

"Our current laying period is 87 weeks, and we want to extend that to 100 weeks, to improve both our carbon footprint and productivity. We may be moving away from the Lohmann Classic breed we currently have, but if we change the diet as well, we have to be sure it'll take us in the right direction," he notes.

"We're putting as much beans into the diet as we can, based on the information we have. But we need to know more, for example, what would be the effect of de-hulling or heat-treating the beans?"

While there are limits on how much John is prepared to experiment with the flock, he's taken a freer hand with the arable rotation to make it more resilient. Potatoes grown on land rented out were dropped. "The revenue simply didn't cover the cost of damage to the land. Oilseed rape is a high-input crop and we stopped growing it

in 2013. I get FOMO (fear of missing out), but overall have learnt that no brassicas in the rotation is a good thing.

"What's interesting is that what we now have in the rotation is largely back to what my grandfather grew in the 1930s. But I'd like to think we have a far more scientific approach."

## On-farm trials

Winter and spring-sown beans provide the main breaks in a rotation that includes winter wheat, spring barley and spring oats. John's been taking these crops through various on-farm trials, looking not just at yield, but quality of the crop, particularly its protein, effect on biodiversity and soil health across the rotation.

"There's an enormous interest in intercropping at the moment. We've tried every which way with beans, peas, spring wheat and even with lentils. We've found the best way to get home-grown protein is to grow beans on their own," he concludes.

Last year he grew beans alongside a beans and peas mix in the same field. "You have to have a 2ha minimum trial size for a proper farm-scale comparison," he insists.

The beans yielded 5.2t/ha with the beans and peas together at just 4.3t/ha. "But the beans and peas had a lower protein level than beans on their own."

What he's noticed is a symbiotic effect they have with biodiversity. "We have margins surrounding all of our fields with beetle banks too. I'm convinced the pollinators have a beneficial effect on the beans as you notice a thicker crop when combining near the margins."



*Last year John grew beans alongside a beans and peas mix in the same field to compare yields and protein contents.*



*John has noticed a symbiotic effect between beans and biodiversity and is convinced the pollinators have a beneficial effect as he has noticed a thicker crop when combining near margins.*

Beans make up 20% of the rotation and John feels that's about as far as it should go — any closer together and there may be problems with soil-borne diseases. "We're also working hard to improve the feed value of cereals in the rotation," he continues.

"You're trained to grow barley with low nitrogen for malting, but this year we've grown Skyway spring barley for a higher crude protein, and actually achieved a higher level than we get from the wheat. We process the oats with the very best going for human consumption and the lighter fraction kept for hen feed."

For John, however, there's a limit to how much he feels he can achieve on his own farm. "There simply hasn't been the research that's looked at how we can maximise the production at a holistic level and utilisation of home-grown protein. If we're aiming for a transformative shift in UK agriculture, my concerns centre around scalability, efficacy, and adaptability."

He believes it's not necessarily about doing lots of small-plot trials but bringing together the knowledge and making sure the outcomes and learnings are genuinely beneficial for farmers like him. "Home-sourced protein is what we grow and it's what the nation needs," he says.

In the meantime, John's spending less "dead money" on energy, his GHG emissions are reducing year-on-year, the farm's biodiversity and soil health is improving, and so is profitability "It's farming that makes you happy," he concludes. ■



# Real Results Pioneers

**BASF**  
We create chemistry

## An honest approach

**The risks of growing specialty crops like potatoes are on the rise and the mitigations available are decreasing, meaning tools to help growers maintain yield and marketability of crops are vital. CPM finds out how a Scottish grower is tackling costly potato skin blemish diseases.**

*By Charlotte Cunningham*

**Potatoes can be a tricky crop to perfect, with producers often facing a plethora of challenges during the growing season, from drought to disease.**

With the marketability of crops significantly affected by damage or blemish, it's estimated that rhizoctonia, silver scurf and black do, blemish diseases, are together estimated to cause annual losses in the region of £5M to the industry — according to figures from Fera Science — with losses occurring due to both lack of marketability and reduced yield caused by these diseases.

J & E Smillie know these challenges all too well, growing over 280ha of seed potatoes in Perth, Scotland. Founded by the late Gordon Smillie, the potato growing and merchant business is now headed up by Alistair and Fraser Melrose.

Having grown vastly from humble beginnings, the business is now producing everything from their own pre-basic seed to new varieties for both the UK and export markets.

### Good skin finish

Potatoes for export is a huge part of the business, with seed crops destined largely for North Africa and the Far East. While this is a lucrative market, it also has a very high requirement for a good skin finish, explains Fraser.

What's more, the Canary Islands have recently announced nil tolerance on imported soil — meaning potatoes can't be imported if there is surface dirt on the tubers. "With that, you're obviously exposing the skin totally to a full visual inspection. So again, skin finish is very important."

And with varieties for export often unable to find a domestic home, there's no Plan B, meaning it's vital to protect and prioritise skin finish right from planting, adds Fraser. "We're interested in providing high grade seed to high grade markets. So, with that the pressure is on to get that crop in the ground, up and away and stay healthy."

With disease being one of the biggest threats to skin finish, the farm has been ▶

*“If you start even, you'll stay even.”*



*Containing the active Xemium (fluxapyroxad), Honesty is an SDHI fungicide providing activity against rhizoctonia, silver scurf and black dot, and has incidental activity against dry rot, gangrene and other key potato challenges, explains Paul Goddard.*



Paul Overton has been overseeing the trials as a consultant for BASF, testing Honesty extensively over the past three seasons in varied climatic conditions and soil types.

► hosting trials with BASF to test out its new liquid tuber treatment, Honesty. Containing the active Xemium (fluxapyroxad),



Trial work has shown that Honesty can bring additional physiological benefits to the crop, by boosting stolon initiation which results in even, good looking potatoes, resulting in more marketable grade out.

Honesty is an SDHI fungicide providing activity against rhizoctonia, silver scurf and black dot, and has incidental activity against dry rot, gangrene and other key potato challenges.

## Strategic decision

While Honesty has been approved for almost three years now, BASF's Paul Goddard says a strategic decision was made to delay its launch until this year. "At the time of approval, the market was in a state of change. In the past, we were heavily leaning on powder treatments, but these were being lost and liquid treatments were coming in to replace them," he explains. "With it being a completely new area, we wanted to invest time into the product and understand fully its capabilities before we put it onto market, and working with growers, like J & E Smillie, has been an essential part of those trials, research and development work."

Independent agronomist, Paul Overton, has been overseeing the trials as a consultant for BASF, testing the product extensively over the past three seasons in varied climatic conditions and soil types.

The trials have looked at a wide range of factors including any varietal differences when Honesty was applied, he explains. "We spent two years running variety screens, applying Honesty to the top 30 seed varieties to see if there was any varietal sensitivity.

"Two years of results showed that Honesty actually had a positive effect on every variety. Sometimes it's quite difficult when you're trying to prove a negative," he laughs.



J and E Smillie produce seed potatoes for UK and export markets, with the exports requiring a particularly high skin finish.

They also ran grower trials with J & E Smillie, doing commercial applications comparing it with untreated crops, adds Paul Overton. He says the Honesty treated crops consistently had low — or no — presence of costly skin diseases and very clean, smooth skin finish.

As well as its disease control activity, the trials work has shown that Honesty can bring additional physiological benefits to the crop by boosting stolon initiation — which results in even, good looking potatoes, resulting in more marketable grade out.

"These new generation treatments — which I class Honesty to be — also give a nice evenness to the crop," says Paul Overton. "You tend to see more even emergence, even stem numbers, good stems and stolon health. And if all the tubers are even and the same size, it makes that crop easier to manage into senescence and burn down."

Particularly for export crops, like J & E Smillie are producing, burn down can become a very pressurised time, he adds. "So if the crop is an even size, it's easier. There's nothing worse than sticking your fork in the ridge and thinking, 'I could do with some of the small ones getting a bit bigger and some of the big ones, not getting any bigger'.

"And in the past even with sulphuric acid and diquat, they were not hand brakes — you can't just pull the hand brake on and stop the crop. So starting and staying even just simplifies management hugely. If you start even, you stay even, and it's as simple as that because they will come in with a top-grade size."

Paul Overton says he has also noticed rooting benefits. "I think in the industry we underestimate the effect of early root development, health and stem numbers have on tuber initiation," he notes. "Something I've really been impressed

## Product pipeline

As well as protectant activity from Honesty, potato growers can now also benefit from a newly launched fungicide which was debuted at the recent British Potato event.

Privest (ametoctradin+ potassium phosphonates) is designed to target late blight and provides a unique mode of action with the combination of ametoctradin and potassium phosphonates to trigger natural defence mechanisms within potato crops, explains Paul Goddard. "It's the first approved use of potassium phosphonates in a potato crop. Privest offers multiple modes of action because potassium phosphonate has both direct and indirect activity plus the activity of ametoctradin.

"In Eurofins trials over the past four years, Privest has consistently delivered 'top drawer' efficacy, as a standalone product and when compared to some of the top performing

alternatives in this category."

What's more, the ametoctradin is unique as there is nothing else on the market classified under the QoSI group, he adds. "Being in a unique group means that the management of the active is easier and also simplifies inclusion in the programme.

"With the EU 43\_A1 strain of late blight recently appearing in Denmark — which is resistant to CAA chemistry — this product fits very nicely where something like Revus (mandipropamid) would have been used in the past."

In terms of where it fits in the programme, Paul Goddard says Privest is best used early in the season, during the rapid canopy stage. "It's truly systemic and if you want to protect new growth then the way to do that is with a systemic product."

with the Xemium is this great big root ball that is created.

"We've seen it in some of the tests we've done that the eye opens, the shoots emerge and very early fibrous root is enhanced by the Xemium."

As well as in the field, this effect was seen within safety work carried out with Scottish Agronomy, explains Paul Overton.

J & E Smillie also trialled the Honesty Potato Pack system — which BASF is calling a two-can solution. "Honesty is applied using a roller table at a rate of 0.2 l/t, with 0.05 l/t of application enhancer, available as what we've called the Honesty Potato Pack," explains Paul Goddard.

"This pack pairs the Honesty with a blue colouring solution to ensure those applying the product and growers can readily see the fungicide coverage."

Paul Overton adds that this makes the product really usable for growers. "We tested it in the shed and it is very machine compatible and the formulation went down well — it holds in suspension nicely and makes it very obvious which crops have been treated, compared with some other



*The Honesty Potato Pack pairs Honesty with a blue colouring solution to ensure those applying the product and growers can readily see the fungicide coverage.*



*Honesty treated vs untreated potatoes, illustrating the distinctive blue colouring.*

products where you can barely tell.

"We did a couple of years of testing to ensure application was optimised not only via calibrating the nozzle and having the right rate but also so that retention on the tuber was high. This was something powders really failed on previously, so we've come a long way now with these new liquid treatments."

## Holistic solution

That said, Honesty isn't a silver bullet, concludes Paul Goddard, but instead part of a holistic solution. "The key thing with these new treatments is that growers will be able to use them to make a good seed better — it's not about saving distressed stock."

Paul Overton adds: "2024 is going to be a very difficult season because the seed grown in 2023 that we're going to plant next year has been exposed to quite a lot of bacterial problems and anytime you're harvesting warm and wet soils — and there's any amount of water logging — the bacterial load on seed increases.

"If you want to see the difference and impact this can make, I'd encourage everybody to keep back an untreated sample and a treated sample just to look at.

"Ultimately, if you get it right from the start, you're more likely to get the best performance from crops. Start right, stay right."

Looking to the future, Paul Overton says J & E Smillie are keen to continue with Honesty. "I think confidence with seed treatment is key and the trials give the grower experience to see how they and the crops handle them, as well as the opportunity to feedback on any issues."

Paul Goddard finishes: "It's vital that these products are tried and tested in the real world and having a network of growers like



*Testing of the Honesty Potato Pack in the shed showed it is very machine compatible and the formulation went down well with staff at J and E Smillie.*

J & E Smillie to enable this is crucial when it comes to developing sustainable potato solutions for the future." ■



*Field work has highlighted that more even emergence, even stem numbers, good stems and stolon health was seen where Honesty was applied.*

## The Real Results Circle

BASF's Real Results Circle farmer-led trials are now in their sixth year. The initiative is focused on working with more than 50 farmers to conduct field-scale trials on their own farms using their own kit and management systems. The trials are assessed using ADAS' Agronomics tool which



delivers statistical confidence to tramline, or field-wide treatment comparisons — an important part of Real Results. The features also look at

related topics, such as environmental stewardship and return on investment. We want farmers to share their knowledge and conduct on-farm trials. By coming together to face challenges as one, we can find out what really works and shape the future of UK agriculture



# Intelligent design for new fungicide

## Iblon launch event

While discovering new active ingredients still requires extensive screening, digital tools are set to speed up the process, removing the element of luck. The launch of Bayer's new fungicide, Iblon, in London marked the first of these intelligently designed molecules.

By Lucy de la Pasture

Just like London buses, registrations of new fungicide molecules have been coming one behind the other over the past couple of years, after what has been a fairly long hiatus. So it was fitting that the UK's capital hosted the recent launch of isoflucypram, branded as Iblon, which also marked the first European regulatory approval.

Ironically, farmers in the European Union will have to wait at least another three years before they have access to the new wheat fungicide. The UK's Chemicals Regulation Division (CRD) acted as the Rapporteur Member State responsible for evaluating the active substance and producing a draft assessment report for its fellow member states, at that time, to

consider. After Brexit, France took over that function and the decision was made to ignore the work done by CRD and start the evaluation process again, which is why they are so far behind the UK which accepted its own report.

The active substance belongs to the succinate dehydrogenase inhibitor (SDHI) group of chemistry and offers a step-change from Bayer's pioneering cereal SDHI, Aviator Xpro (bixafen+ prothioconazole) — first launched in the UK in 2011 and subsequently combined with SDHI active, fluopyram, as Ascra Xpro in 2016.

### Unique structure

According to Michael Maue, Bayer's global project lead, the "unrivalled biological efficacy" of Iblon is due to its unique molecular structure. It has an N-cyclopropyl ring at its centre, and it's this that makes a difference at its target binding site in the pathogen. In the field this translates to efficacy on a range of diseases, notably septoria and rusts, and distinguishes the active as a new subclass of SDHI chemistry.

The structure of the isoflucypram molecule was a deliberate design process and the addition of the N-cyclopropyl ring transformed its efficacy, he added.

As well as Iblon's intrinsic activity, Michael highlighted the new fungicide's formulation as the second factor giving it good field performance. "A fungicide formulation needs to give the active ingredient the ability to penetrate the waxy



leaf layer into the upper epidermis, so it's protected against environmental stresses — such as rain — and it's available for



Michael Maue described Iblon as having "unrivalled biological efficacy".

systemic transport in the leaf to better protect the plant. It should also have good spreadability on the leaf surface. These are both optimised in Iblon's formulation."

The regulatory requirements in the European Union — mirrored in the UK's own regulations since Brexit — have tightened under its hazard-based criteria, adopted in 2009. Active ingredients have been lost as their registrations come up for review and the flow of new molecules through the pipeline has slowed. Iblon's own journey began 15 years ago, and Michael described its development path

as "complicated, with a few potential show-stoppers" which the Bayer team navigated by finding scientific answers to the regulatory questions posed.

In addition to Iblon's performance on many of the diseases that trouble wheat crops in the UK, the emphasis at the launch was as much about resistance management to preserve its efficacy for years to come.

SRUC's Professor Fiona Burnett welcomed the new chemistry and rated its performance as very similar to the other new fungicide actives on septoria. "The UK

is very reliant on multiple applications of a limited palette of chemistry. Iblon is an exciting new tool, but let's think about how we steward it going forward," she said.

"Since the strobilurins [which totally succumbed to resistance in the 2003 season], we've developed much better ways of managing chemistry from a resistance perspective. Trials show that what is done on an individual farm really matters when it comes to pathogen shifts in sensitivity," she said.

"Dose is the ultimate choice to be made in the field — using appropriate balanced ▶

## Iblon – the technical details

Initially, Iblon is only available in co-packs while approval of a co-formulation is awaited by CRD (predicted for 2025-26), said Rosalind O'Hare, Bayer campaign manager for combinable fungicides.

The Iblon co-pack will contain Vimoy (isoflucypram) and Proline (prothioconazole), and Vimoy plus Jessico One (Inatreq) will also be available as a co-pack following a global agreement with Corteva Agriscience for Bayer registration of its active ingredient fenpicoxamid.

Vimoy can be used at rates of up to 1.5 l/ha (75g active substance/ha), with a minimum recommended rate of 1.0 l/ha (50g as/ha), and Proline at 0.5 l/ha, supplying 125g/ha of prothioconazole. Jessico One should be applied at 1.2 l/ha, supplying 60g/ha of Inatreq.

One of the main advantages of Iblon is its broad spectrum of disease control in wheat, with activity on septoria, rusts, and eyespot. Comparing its efficacy against septoria to new-generation triazole Revysol (mefentrifluconazole), and Quinone-inside Inhibitor Inatreq, Rosalind slots Iblon in between the two, with Inatreq acknowledged as having the edge.

"It also has good activity against both brown and yellow rust, performing at a similar level to the number one yellow rust fungicide, the SDHI Solatenol (benzovindiflupyr). Brown rust is Iblon's biggest strength, and it's at the top level of current best chemistry against the disease."

Eyespot activity is another string to Iblon's bow and it offers added control to the previous best option. "Prothioconazole is the benchmark for eyespot, with around 40% control of W- and R-types. Ascra offers a little extra activity, and Iblon adds a few percentage points more again. Mildew and fusarium are mostly covered by prothioconazole," she added.

The alternative Vimoy co-pack with Jessico One looks to be particularly suited to the T2 timing. "The combination of these two actives, with well-balanced efficacy on septoria, will

provide the best possible anti-resistance strategy at the recommended dose rates. It's important to note that although both actives have strong activity against septoria, dose rates shouldn't be trimmed as this would be against the Fungicide Resistance Action Committee guidelines."

Rosalind has a similar warning for Vimoy in Iblon. "One of the regulatory hurdles Iblon had to navigate was the environmental fate of its metabolites, and this resulted in an approval restriction that only 75g/ha of Iblon can be applied to a field every two years. It's really important not to reduce or split the Iblon dose to try and get around this."

Bayer is currently collecting data to submit to CRD to show one of the new fungicide's metabolites doesn't accumulate in the soil and hopes to get this restriction lifted in due course.

As well as the disease control it offers, Iblon has a second ring in its molecular structure — pyrazole-4-carboxamide — and this brings a physiological benefit by way of a greening effect. In Bayer trials, this has extended the green area duration for eight days compared with untreated plants, and three days longer than when the crop has been treated with Ascra.

"Pyrazole carboxamide encourages the upregulation of nitrogen reductase, so more



Rosalind O'Hare slots Iblon in between Revystar and Inatreq in terms of septoria efficacy, with Inatreq acknowledged as having the edge. Iblon will be available in a co-pack with Inatreq in 2024.

nitrogen uptake equates to more chlorophyll, increased levels of photosynthesis and therefore more energy for the plant. It also contributes to an increase in antioxidant enzymes, making plants more resilient to stress," explained Rosalind.

"Plants are reliant on hormones to control their physiology and pyrazole carboxamide also supports hormonal balance. A reduction in ethylene production delays senescence, enabling plants extra time to capture sunlight, which translates to 0.15t/ha yield per extra day of greening."

### Product details for 2024

Co-Pack Name	Contents	Active ingredient	Recommended rate	Restrictions
Iblon	Vimoy	Isoflucypram (50g/l)	1.0 l/ha (50g)	<ul style="list-style-type: none"> <li>• Max 75 g/ha in two years</li> <li>• 5m aquatic buffer zone</li> </ul>
	Proline	Prothioconazole (250g/l)	0.5 l/ha (125g)	
Unnamed	Vimoy	Isoflucypram (50 g/l)	1.0 l/ha (50g)	<ul style="list-style-type: none"> <li>• Max 75 g/ha in two years</li> <li>• 12m aquatic buffer zone</li> </ul>
	Jessico One	Fenpicoxamid	1.2l/ha (60g)	

Source: Bayer



*Fiona Burnett warned that the actions of individuals would ultimately decide the longevity of the new fungicide products available to them.*

► mixtures, alternating and mixing fungicide modes of action, and reducing but not splitting fungicide doses. Diversifying, with a new SDHI to add to programmes, brings benefits,” she said.

Fiona warned that its time for individuals to take responsibility as it's their actions that will ultimately decide the longevity of the products available to them.

“Stewardship is an individual responsibility for the collective good,” she emphasised.

New Zealand farmers were the first to benefit from Bayer's new fungicide chemistry, with its regulatory authorities granting approval for use in the 2019-2020 season.

Bringing his experience of Iblon to the launch, NZ farmer Eric Watson outlined his farming system on the Canterbury Plains and amazing video footage brought this to life with the Southern Alps forming a stunning backdrop.



*New Zealand farmer Eric Watson has been impressed with what he's seen of Iblon on his own farm over the past few seasons.*

## Digital tools to enhance innovation

According to Michael Maue, the development of Iblon reflects “a move away from advanced trial and error [in the discovery process], to really designing a molecule with desired features”.

This intelligent design is made possible by the advancement of digital technologies such as deep learning, machine learning, artificial intelligence, big data generation and analysis. “All of these tools help us to actually find specific molecules more quickly than before,” said Michael.

A technology that is already being used in Bayer R&D is deep learning. “This helps our chemists to synthesise molecules in a faster and better way. And for this, we treat it as a system or a training system with millions of reactions from internal as well as external databases. And the system is then able to suggest a synthesis route, taking parameters like sustainability or cost of goods into account.”

Another technology being developed is the digital twin — a technology that has been used by Formula One (F1) race teams to build a digital replica of a race car by adding hundreds of sensors to F1 cars and capturing all the information during races. With that, they are able



*Bayer is drawing on innovation in Formula One and aims to create digital twins of farmers' fields.*

to generate a digital twin of the race car where they can predict and simulate how it would behave under certain conditions, as well as set up changes the teams haven't tried before in real life.”

Bayer's idea is to have a digital twin for every field a farmer has and simulate different parameters, including weather conditions, to achieve optimum yield. “This approach will take many years because the parameters and variables are just mind blowing,” said Michael. “It's much more complicated than for a F1 racing car, but I think it's too compelling not to give it a shot.”

Eric's appetite to regain his Guinness World Record for wheat yield, snatched from him last year by UK grower Tim Lamyman, was evident. With two world records already under his belt — recording 17.398 t/ha in 2020, beating his previous

record of 16.791 t/ha in 2017 — Eric believes Iblon will be instrumental in his next attempt to regain the record he covets. To beat his UK rival, he said, it just needs the right amount of sun, at the right time... ■

## Predictive disease management

A crystal ball would come in handy when making fungicide recommendations — the weather, latent disease, and evolving pathogen populations can make a fool of the best agronomist. But help may soon be at hand to provide future insights into whether and when to apply fungicides.

Talking at the launch event, Fabrice Houdebert, Bayer cluster lead for NW Europe, said the company is working hard to invent a prescriptive disease management tool for wheat, called PreDiMa. The new tool will be customised for the UK, France, and Germany and early versions of the model have already been tested in the UK.

“PreDiMa is a methodology to predict what to apply, if you need to apply, and on which field you need to apply with high precision. This is the power of digital agriculture and data ingestion that we are putting in motion to bring forward this new service.



*Fabrice Houdebert described the company's commitment to integrate crop protection, seeds, crop nutrition, and digital farming to become a holistic system that's more productive and more sustainable.*

“It's an example of our commitment and the stimuli to bring together crop protection, seeds, crop nutrition, and digital farming to become a holistic system that's more productive, more sustainable, more regenerative.”



# Spreading the risks

**Better buying, better selling**

**Spikes in the price of global grain markets followed by months of decreases have left the market feeling flat, but sitting on grain waiting for more bullish days might not be the answer. *CPM* takes a closer look.**

**By Melanie Jenkins**

**A tumultuous 12-18 months has seen grain markets spike dramatically, with feed wheat hitting over £300/t, but now prices have settled it can be easy to mistake this for stagnation and to sit on grain in anticipation of further steep price hikes however, a risk averse approach isn't necessarily the right one.**

According to Openfield's member services director, Richard Jenner, the past few years have demonstrated that volatility in grain markets can be massive. "It can come down to local supply and demand within the UK, but there are lots of geopolitical events that will drive grain prices.

"The previous 12 months have shown

just how drastically these events can impact markets — be it issues with production around the world, avian influenza or the Russian invasion of Ukraine. And now we're in the midst of an unforeseen conflict between Israel and Hamas."

## **Market impacts**

When the markets move so strongly it leads to second guessing, says Openfield's head of sales and trading (barley), Ed Hodgson. "We ask whether now is the right time to sell or should we hold off until tomorrow, or should we wait even longer. It's created a challenging period of trading but has also brought one of the best opportunities to the industry for a long time in terms of making money for the farm and throughout the supply chain. It's been a blessing and a curse."

However, initial logistical challenges to move grain out of Ukraine were overcome quite quickly through deep water and overland exports, and the current fighting in the Middle East is unlikely to impact markets, explains Richard. "So since the peaks experienced last year, prices have subsequently declined almost in a straight line from the start of October 2022."

As a result, markets have appeared pretty flat and unpalatable, which is especially noticeable when combined with higher input costs, meaning selling ▶

*“ Because we don't grow maize, we often don't realise that we have to worry about it. ”*



*According to Richard Jenner, a lot of farmers are sat on their grain waiting for something to cause another price spike.*

# Better buying, better selling



*The past few years have demonstrated that volatility in grain markets can be massive.*

► anything might only result in breaking even, or perhaps making a loss, he comments. "It appears that a lot of farmers are now sat on their grain waiting for something to cause another spike, but we just don't know whether this will be the case."

Timing trades is a notoriously tricky endeavour, says Ed. "Fundamentally it's

about finding a day that works for you and having confidence that whatever happens tomorrow, the decision you made today suited your business."

Watching out for risk cues can help guide the selling of grain even if these won't indicate when the best time is to do it, says Richard. "However, we can learn how to manage the risks on an individual basis."

## Marketing plans

And while marketing grain might sound like a simple and straightforward procedure, watching for all the cues and fluctuations alongside running a farming business can be a challenge for an individual farmer trying to get the best return on investment, he says. "Therefore, it's important to think about the risks you're facing each year and come up with not just a plan A, but also a B and C.

"The first place to start is to establish your cost of production to understand



*Timing trades is a notoriously tricky endeavour and is fundamentally about finding a day that works for the individual, says Ed Hodgson.*

where your break-even point is. From here, you can establish a break-even plan and a minimising loss plan, and not just for Harvest 2023 but for 2024 as well, which should present a year where cost of

## Barley and OSR

Recent rallying of the barley markets is an opportunity which might not appear for another 20 years, so it has to be seized when it comes along, says Ed.

"Barley prices have noticeably drifted off since the highs of last year but appear to have finally flattened for the first time since just after harvest. Prices are still ranging a bit, but we've found a period of stability. Prior to this, selling was about knowing your cost of production and committing if you were going to be making a profit. It's about learning to attack the opportunities when they come along because it avoids sitting and asking when another bounce is going to come."

Ed highlights that feed barley largely trades in line with but at a discount to other commodities. "Knowing your cost base is the biggest thing to be aware of but you also have to expect markets to look relatively flat or similar to how they did in the 10 years prior to the Russia-Ukraine war. We have to see €10 moves on the Matif as normal, rather than something to dismiss. If a small move is in line with your cost of production and cashflow, then it's an opportunity worth taking."

This year's feed barley crop is anticipated to be similar in size to last year, says Ed. "Although the country exported just over 1M tonnes then, based on the current pre-Christmas exports it would be incredible if we hit that figure this year. Because Black Sea origin grain is so much cheaper than ours and has been aggressively

sold to our key markets of Ireland and Spain, we can't compete."

Malting barley is already in a challenging situation, but for different reasons, explains Ed. "In many ways, last year was the perfect malting barley year, with a great growing season, good quality, a big crop and strong exports. We thought this year would be similar but the weather at harvest wasn't conducive to producing a good malting barley crop.

"Luckily, end users had a large stock of old crop which they only had to start blending with new grain in November, but there are now substantial quality concerns in the UK and Europe," stresses Ed.

"Many farmers sold at harvest, getting record highs of £80-£90 premiums, something we're seeing again because of the quality concerns. But knowing your quality and holding onto it has never been more vital. If you sold something committed forward, you have to keep moisture down, keep it cool and check germination — have regular tests done on your stores because there are already reports of pre-germination."

With this in mind, it's poignant to expect higher rejections from UK deliveries than have been seen over the past five years, he adds. "When we're talking about £60-£70 premiums, the cost of rejections is going to be massive. If you know you have a problem, tell your grain sales partner as soon as possible in case stocks can be sold early. Or in the case of a default, have the conversation early to see if there's a



*If growers have good quality malting barley in store and can keep it that way, then the premium structures are likely to hold.*

possibility to reduce contracts.

"What we're hoping to see is bigger claims rather than increasing rejections, whereby a portion of the premium is reduced when a load is slightly off specification. It might be the case that you have to be more flexible in terms of the claim structure you're happy to accept to get your grain tipped," he says.

"But ultimately, if you have good quality malting barley in store and can keep it that way, then the premium structures are likely to hold."

Along a different thread, oilseed rape area has been in decline for several years across the UK, something that's likely to continue, says Ed. "The UK imported 700,000t last year and it's likely to be similar this year. The big consumers in the UK have become used to importing and are less reliant on a domestic crop, meaning our prices will be led by imports.

"From a marketing point of view, if there's profit in the crop and you know your cost structure, then taking a profitable price is the right thing to do."



production is lower and therefore returns are better based on current new crop values.”

As time progresses, it's important to keep abreast of risk cues, such as the weather, which will impact plantings and harvest which will affect quality, he advises. “And also keep an eye on what's going on around the world. There are a lot of resources for this, such as from the AHDB. But you can't watch everything, so you have to decide which are likely to be most important — and these change throughout the year.

“Working with a trusted partner — such as your grain trade partner — helps you to navigate these issues and means you don't have the impossible task of trying to keep abreast of everything.

“There are a number of ways of implementing risk management strategies, some involve forward selling, others using trackers, or min/max contracts and pools. It's not just having to sell flat pre- or post-harvest, because there are various tools available. So instead, use the different options at your disposal to help manage some of that risk.”

Trackers, in essence, are very simple, explains Richard. “Whatever you're tracking — say that's wheat on the London futures market — then you're committing a volume of grain and part of that's sold on your behalf every day. At the end of the set period, the tracked value is converted into a physical ex-farm price.

“During the past couple of years, an average of the market performance would have been quite a good outcome. So although trackers might not sound exciting for those who want to play the market, they can de-risk your business.”

According to Ed, trackers can be exceedingly useful in a bearish market. “I'd also use a tracker as a benchmarking opportunity. If you have a large farm, putting down 25% of your grain where you're poised to not get less than the average price means you don't lose out — trackers guarantee you don't lose to the market.”

On the other hand, pools can be open to misinterpretation whereby the assumption is they work like a tracker, says Richard. “These might work slightly differently in each organisation, but at Openfield a pool works on the basis of whatever commodity is involved, members commit themselves to market in a pool period, which tends to be around harvest, autumn, spring or summer — the standard movement periods. Once these

commitments have been received, the marketing team spend time devising plans to market the commodity and then go about enacting these.

“As a farmer, you're collectively benefiting from not flat selling and also have the advantage of a team whose entire job is selling a commodity to get the best outcome. However, these do require some flexibility around movement.”

Pools are useful tools for those who are unsure of what to do every day, says Ed. “Selling grain through pools means the people who live and breathe trading are helping to make those decisions for you.

“So there's an argument for selling some forward or post-harvest flat, having some in a tracker and some in a pool, because across those three instruments, you should be able to manage your risk quite well,” says Richard.

## Global influence

Openfield's head of research, compliance and shipping, Cecilia Pryce points out that because UK production only accounts for 1.8% of the global wheat crop, domestic prices will follow rather than lead in terms of world market movements. “We import more than we export these days and can't forget how lucky we are to have a large domestic demand on our doorstep.

“But because of this position as an importer, if you're looking to market your own cereal grain, you have to look at where global maize prices are, and if you're growing oilseed rape you can't afford not to look at the soya meal and soya bean situation,” she explains. “But because we don't grow maize, we often don't realise that we have to worry about it.”

But she says the whole structure of UK



*If farmers only have time to market grain one day a month, that's just 12 days a year to make decisions on a market that moves every day, flags Cecilia Pryce.*

agriculture is about to change. “One of our biggest domestic issues is the lack of data on what's being grown, so we don't know what UK food security looks like and whether we should be planting more wheat and reducing oats and pulses, for example. We could also be running the risk that the push for environmental land use takes too much area out of food production, which could push prices up again.

“The key message is to know what you're good at doing and to not follow the crowd unless you're confident. But if you only have time to market your grain one day a month, that's just 12 days a year to make decisions on a market that moves every day, and this is when it could be worth getting someone to market your grain for you,” concludes Cecilia. ■

## Better buying, better selling

To remain at the forefront of arable farming and to maximise the value from every hectare of crop grown requires a keen understanding of the grain market, the seed to supply it, and the fertiliser to feed the crop.

Through this series of articles, *CPM* is working with Openfield to provide a market insight and help farmers to focus on these major business decisions to ensure better buying of inputs, and better selling of the produce.

Openfield is Britain's only national farming grain-marketing and arable inputs co-operative, owned by over 4000 arable farmers. Openfield's team works with a total of 6000 farmers to

supply some of the biggest and best-known names in the British food and drink manufacturing industry.

But there's more than just grain to Openfield, supplying seed and fertiliser, providing grain storage and offering expert advice on grain marketing and risk management. This delivers innovative supply chain solutions to its farmers and clients.





“ But it’s a topic that is poorly understood by many growers ”

# Optimising soil pH for the environment

## pH optimisation

**The impact on soil biology of a small deviation from target pH levels can have a significant effect on the environment as we move to a more sustainable future. CPM investigates.**

*By Rob Jones*

**Maintaining soil at optimum pH will be an increasingly important aspect of management for growers needing to maximise productivity, reduce input costs and meet the increasingly stringent environmental demands of a more sustainable future, soil experts believe.**

New research is showing how even a small deviation away from a target pH of around 6.5 can have a significant impact on soil biology, nitrogen utilisation, uptake of key nutrients and the emission of injurious gases such as carbon dioxide and nitrous oxide.

“We’ve got to bring soil management and liming into the 21st century,” says David McLellan, a member of the AHDB RB209 fertiliser use steering group and chief agronomist at Omya.

“The old adage that all you need to do

is apply 12.5t/ha of agricultural lime every five years or so is still advised and practised by many growers, but it is way short of the mark in terms of what all the latest research is telling us.

“It’s far better to keep soil pH at a consistent level year on year and there are ways of doing this that don’t rely on applying huge amounts of material using super-heavy equipment once every few years.”

Understanding the impacts of pH on soil, its biology, ability to make nutrients available to plants and the potential environmental harms of ignoring it, is key to changing the industry’s misplaced complacency around the topic, he says.

“Recent data from the Professional Agricultural Analysis Group (PAAG) indicates that 41% of UK arable soils have a soil pH of less than 6.5 and 57% of grassland soils have a pH of less than 6.0.

“Over the past 40 years, there has been a dramatic decrease in the production and the use of agricultural limestone. Since 2000 there has been less than 2.0m tonnes of limestone produced annually whereas in the 1980s and early 1990s, it was approaching 4.0M tonnes.

“The 2022 British Survey of Annual fertiliser use shows that of almost 7000 farms/fields surveyed, only 8.2% applied lime in 2022 and all this is against a backdrop of soil pH falling

steadily in recent years.

“Yet, if you look at virtually any indicator of productivity and soil health you will see that every one of them is adversely affected by poorly managed soil pH.

“This is not only hitting growers hard now in terms of lost production and the purchase of costly inputs they don’t really need, it’s also storing up major environmental problems at many levels for the future.”

### Single most important indicator of soil health and productivity

According to Dr Sajjad Awan of independent agricultural and environmental analysis specialists NRM, pH is the single most informative indicator of soil health and productivity a grower or agronomist can have.

That said, a meta-analysis of consolidated data carried out by the company on thousands of soil samples from across the UK shows very few farms have soils at optimum levels and this is costing the industry dearly, he points out.

“It’s crucial to manage soil pH effectively as it has such an important impact on so many different elements of crop production, input use and the environment.

“Optimum pH ensures microbial activity functions at its full potential and improves



*"Soil pH is the single most informative indicator of soil health and productivity a grower or agronomist can have" says Dr Sajjad Awan.*

the soil's ability to mineralise key nutrients. It's also better for the environment, protecting against erosion and nutrient leaching and improving soil structure.

"But it's a topic that is poorly understood by many growers both in terms of its effects on crops but also how it can be corrected and maintained.

"For a start, pH is based on a logarithmic scale, where pH 6 is 10 times more acidic than pH 7, so even apparently small changes in apparent value can have big implications to nutrient mineralisation and availability.

"Some soils are naturally acidic whereas the pH of others can change from one year to the next through rainfall, growing crops and the application of manures, slurry, and fertilisers.

"Bear in mind that pH can also vary significantly across a farm, so the only way you can track it and make the right decisions is to carry out regular soil mapping and analysis as part of your routine crop management."

## New insights into effects of soil pH

The NRM analysis has revealed some particularly interesting new insights into the extent of the issue in the UK and its effects, Sajjad says.

"According to the nutrient Management Guide RB209, the recommended soil pH for growing most arable crops on mineral soils is 6.5. At this pH, most mineral nutrients are sufficiently available for ideal crop growth and yield.

"Yet out of all the samples we have analysed in the past five years, only around 3.5% were at this optimum pH of 6.5 and nearly 41%

of samples were below this.

"Getting soil pH right is important because our results suggest soil respiration levels, which are a good proxy for soil microbial activity and overall soil health, could fall by 10-15% for every change in pH of 0.5 on either side of the optimum.

"We've known these pH values are roughly right for some time as RB209 suggests the optimum pH is 6.5 for arable land but the rate of decline in soil respiration either side of this has never really been documented before.

"In fact, if soil pH falls to 5.5, wheat yields can be reduced as much as 25%. phosphate is also restricted at less than optimum pH levels and soils that are more acidic increase the solubility of plant toxic metals such as aluminium, which also leads to impeded growth."

David agrees, pointing out that a soil at pH 5.5 it will achieve only 77% of the Nitrogen uptake one at the optimum pH 6.5 would.

"That's like 1kg of N out of every 4kg you buy, doing absolutely nothing or the bags you're buying being only threequarters full. It has that much impact.

"If your soil biology is suffering as a result of poor pH management, no amount of N is going to deliver the yields you want because the soil is out of balance and all the N gets locked before the plants can get anywhere near it.

"Potassium uptake suffers to a similar degree but it's even worse with phosphate which plummets to just 48% at pH 5.5."

Regular liming also improves soil structure and soil water retention, he points out.

"Unlike some agents that can reduce pH such as magnesium, calcium actually pushes clay particles apart and this aids aeration and water flow through the soil rather than it being trapped and creating anaerobic conditions.

"This encourages the soil biology to thrive and encourages strong root growth, but it also improves soil water retention and availability for plants - an increasingly important factor in light of the increasingly common drought conditions experienced in recent years.

"Bulk density is reduced, giving increased porosity and water infiltrates more quickly with less risk of run-off or erosion.

"Calcium is also essential for the proper functioning and health of plant tissues, being essential for opening the stomata and allowing the plant to maintain its transpiration even in hot weather."

While the productivity benefits of maintaining soil pH at optimum levels are



*"Without your soil pH being properly balanced, it's like every bag of fertiliser you buy being only threequartersfull," says David McLellan*

many, so too are the environmental ones, he says.

"The European Agricultural Fertiliser Association has suggested that if the whole of France's agriculture was balanced for pH, nitrous oxide (NOX) gas emissions would be reduced by 15%.

"Plus, you've got the added benefits of reduced volatilisation of ammonia to the atmosphere, lower incidence of nitrogen leaching and the prevention of phosphate run-off.

"The bottom line is that you're only having to put on exactly what you need in terms of crop nutrients because the efficiency of their uptake is so much higher."

## Reactivity an increasingly important metric

In terms of maintaining the optimum pH, big strides forward have been made in recent years with a greater ▶

## Calcium Carbonate benefits to crop production

### Calcium:

- Brings vital element to the plant
- Improves air and water circulation
- Stimulates microbial activity and colonisation of roots
- Improves plant structure and stability

### Carbonate:

- Improves major element uptake
- Increases and restores the clay/humus complex
- Mineralises organic matter
- Activates soil micro flora



*The granulated lime breaks apart very rapidly and increases the surface area that is available to react with the hydrogen ions.*

► understanding of the importance of 'reactivity', David says.

"For a long time, we've just talked about the neutralising value (NV) of treatments and the cost per unit value of this and we're only just starting to think about reactivity, but this is potentially one of the most important elements of a successful liming programme.

"Reactivity is the speed at which a product can raise pH and it's linked to the surface area that is able to come into contact with the soil.

"It's a bit like a Rubik's cube, where if you look at the surface area from the outside it is many times less than if you add up the surface area of all the smaller constituent cubes.

"A granulated lime is made of

micronised powder which, in the case of Calciprill, is made up of particles just 150 microns in size. This breaks apart very rapidly and increases the surface area that is available to react with the hydrogen ions.

"This ultrafine product outperforms coarser limestone treatments with the rapid reaction bringing soil pH to an optimal level very quickly — usually within six months — and the effect is longer lasting than with coarser agricultural lime.

"It's also important on certain crops such as brassicas and oilseed rape etc where you are trying to raise the pH very quickly before you plant to avoid problems like clubroot.

"Another benefit is that it can be simply applied through a conventional fertiliser

spreader by growers rather than having to bring in contractors with heavy, specialist equipment."

Granulated lime is not the answer for everything, however, and there are many different types of lime with every one having its own purpose, he points out.

"We would never tell a farmer with soils of pH 5.5 on lighter land, for example, to use granulated lime.

"His soil is acidic enough to melt rocks, so the solution is to buy something cheap and cheerful to raise it to pH 5.8 or 5.9 then we can look at maintenance using granulated lime from there.

"On heavier clay loam, the same pH of 5.5, although potentially very rare, would require more  $\text{CaCO}_3$  to adjust it, so would need the reactivity of granulated lime to effect even small changes as the cation exchange capacity is much higher."

But growers and advisers need to move away from the thinking that sets a target above an optimum pH with a view that this will reduce to an optimum level over time, he says.

"That thinking suggests if you want a pH of 6.5, for example, you set a target of 6.7 in the expectation it will drop down to 6.5 eventually.

"This is a completely false economy as in the first instance you're putting on too much and secondly you're only going to get one optimum pH level every three to four years depending on how often you lime.

"For optimum yield and crop quality you need an optimum pH at all times, so once you get your pH up there, you need to do regular testing and then use small maintenance dressings to keep it that way.

"We're in danger of not putting enough importance on lime because people think they know how to utilise it and there's not a lot of money to be made from it, compared with other more exciting technology.

"We've got to change the mindset that says that is the way we have always done it and we're going to stick with that. There is so much evidence on how to make soil pH management more effective and the benefits resulting from that.

"If the UK wants to be self-sufficient in food, then we need to be able to get the maximum yield but also farm in a sustainable manner and balance new technology with a more regenerative approach.

"We've learned a lot about calcium and pH its effect on production and environment in recent years but we're really only scratching the surface — there are so many more benefits still to discover." ■

## The ROI of maintaining optimum pH

The Return on Investment (ROI) of granulated lime is typically 2:1, with every £1 spent on product delivering a £2 return in yield, David says.

"You can calculate it quite simply by comparing the cost of the lime to the savings in key nutrients such as NPK and the increased yield achieved from having the optimum pH.

"So, for example, taking a soil pH from 6 to 6.5 would require approximately 600kg of granulated lime at an average of £200/ha (£80/acre).

"You would save 20% of the 2.5 t/ha (1t/acre) of NPK you would otherwise have to apply, which at a current price of approximately £400/t, is a saving of another £200/ha (£80/acre).

"Field trials in winter barley show that the increased yield from having the correct

pH is £300/ha (£120/acre) so the ROI is £500/ha from increased yield plus savings on NPK from an investment of £200/ha in granulated lime.

"Rothamsted research have been running a yield trial on several plots based on pH and liming for over 35 years and this further supports this level of ROI," he adds.

"They found that in crops such as spring barley, liming improves the overall economic benefit with the difference between liming and not liming being £436/ha (£181/acre) and that liming needs to be correctly considered as a capital cost (ref Holland & Behrendt).

"So, an ROI of around 2:1 is realistic metric to work from and this is supported by several sources in arable crops."



# nature matters

by Martin Lines

## Farm assurance schemes: who and what are they really for?

**Is it for adding value to farmers and others in the supply chain? Or is it for standing out in the crowd and demonstrating different forms of production?**

I've always been a firm believer in recognising the difference in production. Whether it's higher standards or levels of intensification, the consumer needs a way to identify how their food is farmed and matched with the appropriate price. I also think as food producers, we should be able to demonstrate the safety standards of our produce by meeting legal requirements wherever necessary. How we show this is always up for discussion; is it a government-inspected body similar to those who visit food retailers or a self-funded inspection to gain a logo or certificate at the farmer's expense?

Over the years, various labelling initiatives and claims by manufacturers and retailers have set out to distinguish between the multiple methods of production. With over half the food produced consumed out of the home in the UK, most of it is unrecognisable and traceable products. What value is a logo

when the consumer does not see it? Many retailers choose not to use a standard recognised label because they see little value in it. What value is it then for farmers to get the same certification?

Certification has been dominated by one label for many years, supported by farming bodies and the wider industry, giving little opportunity for competition. We've seen over the years that a particular farm assurance scheme has continued to add various aspects to a single standard, with many of its producers gaining little benefit.

The requirements for what farmers produce now and in the future are changing. We will increasingly be asked alongside food production to deliver a range of outputs from the land we manage. With a legally recognised climate and nature crisis, regulation is making all businesses understand their carbon footprint and their farm's impacts on biodiversity.

I often feel many of our farming industry leaders are not being truthful in the transition already happening in our sector. There is an element of denial around the scale of change needed to reach our legally binding climate and nature targets, leaving many farmers in the dark with little understanding of navigating this monumental transition to more sustainable food production. As farmers, we know how to react to market pressures and incentives from supply chains or governments. But the push to record and demonstrate our climate and biodiversity footprint remains slow.

I have heard rumours about a Green Tractor farm assurance logo for the last two years. Not being involved in it, I was interested to see what it would mean and what additional

benefits it might give farmers and consumers. Like many, I was somewhat surprised when it was recently announced. Many of the basic things it adds to this supposed flag-bearer of high environmental standards bring little to no value as a standalone scheme. It appears heavily tied to the England ELM scheme and has taken little into account of the delivery timeframe and future schemes in devolved nations.

Regardless of the wider industry's hesitance to accept it, farmers delivering for climate and environmental improvements will be mainstream. So, the standards in Green Tractor, such as proving you have done a farm carbon audit or demonstrating you understand the natural capital and biodiversity on your farm, will just be standard business. What's the value of paying to get certified for something everybody is already doing?

The data collected would be valuable to others in the supply chain who want to mitigate the impacts of their own businesses, and giving this data away at the farmer's expense is really unacceptable. We're already seeing a number of companies willing to pay an additional premium or hectare price to understand or offset their carbon and biodiversity impacts. For instance, ADM is offering up to £48 a hectare to producers growing oilseed rape in return for the delivery of seven key actions so that you can demonstrate you are doing practices that reduce artificial fertiliser, protect biodiversity and improve soil health. Plus, there's a payment for your time filling out the paperwork.

Many other agreements from companies offer similar incentives, with many more following suit. These offers are

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on top of the payments you can receive from SFI23 for doing similar actions. I question why I, as a farmer, should be paying another organisation to demonstrate the steps I'm taking to improve how my business impacts climate and nature. If somebody else wants to benefit from an action I'm doing on our farm and for our business, then that value must also be returned to the farmer. If we're not careful with how assurance schemes take shape, they'll benefit only larger farming businesses that can spread the costs. How do we ensure all farm sizes can survive in the future with a fair balance of risk for everybody?

Having recently attended a conference in France with organisations and farmers in attendance from across Europe, many were envious of how developed our public-funded schemes and private markets seem to be compared with their own. We have a clear market advantage to capture the value of how we farm. This new standard of more sustainable and environmentally-focused farming, and the higher expectations of farmers that come with it, will become the new baseline of production.



## Research Briefing

# Water stewardship

**Are arable farmers focusing enough on keeping pesticides out of water?**  
*CPM reports*

*By Mike Abram*

**It could be taken as a positive sign for farming that minimising the risks from pesticides only merits two paragraphs in the Government's April 2023 'Plan for Water: our integrated plan for delivering clean and plentiful water'.**

But while fundamentally the water protection measures put in place by the industry have helped, there can be no false sense of security about the need for continued focus and improvement from all sectors.

In a perfect world, the water industry would be an unseen entity that nobody heard or saw, requiring no engagement with the agricultural industry, suggests Richard Reynolds, senior agronomy adviser for Anglian Water.

Unfortunately, the reality is that agriculture does impact clean water supplies, he says.

"We very much want to encourage productive, vibrant farming practices," Richard stresses. "But what we see is when losses are happening from the land, the water environment sees that very quickly."

Historically, water companies typically reacted by just building bigger and better machines to clean and remove contaminants from water, and because of that insurance, didn't necessarily need to engage with farmers.

But by working with farmers, there's effectively an opportunity for a win: win situation, he claims.

"We know farmers are not trying to lose nutrients and pesticides into water — they cost a lot so there is a strong commercial incentive to improve, reduce those losses, and at the same time improve the efficiency of their businesses, helping keep farming productive.

"It's why we're spending a lot more time engaging with farmers — we're seeing these outputs and measurements [of losses] and it's something that ties into their businesses.

"It's how can we help farmers so ideally everything that is used on the field, stays in the field. That's my gold standard, and if you don't need to use it in the first place, that's even better."

### Value of water

Farmers probably don't value water as a commercial asset, per se, he suspects, certainly compared with producing food. "But water bodies are a really important indicator that provides a good sense check for farms, whether it is through soil erosion, chemicals washing off, or turbidity in streams."

Understanding why those losses are happening is valuable information for growers, he stresses. "So we need to spend more time talking to farmers, sharing, so they can get a good understanding of where those losses are and why they are occurring.

"In the same way as an agronomist or accountant will be discussing why they're losing money by doing certain things or practices, it's another measure on the business."

*“We very much want to encourage productive, vibrant farming practices. But when losses are happening from the land, the water environment sees that very quickly”*

But he admits that getting locally relevant water quality information to individual farmers is difficult, even though the water companies collect a lot of data from monitoring. "A number of groups including water companies and the Environment Agency have detailed understanding of contaminants in rivers, but very little gets back to the farmer at the local level fast enough for them to do something about it," he says.

That's where collaboration and partnerships are vital. "The water companies might be the source of the information but are not necessarily the first choice of trusted broker, and why we make a point of spending time with the Voluntary Initiative.

"We share information with it every quarter about the levels of pesticides we are detecting, but it is the credibility of the people in the VI team and manufacturers like BASF that take that message back, contextualise it to the needs of the local

## Three key questions to ask to help protect water from pesticides

- Do I need to use the pesticide?
  - Easiest way to keep pesticides out of water is not to use them
- If I do, how do I target it to make sure it is effective?
  - That includes other actions before it is used, such as creating stale seedbeds, spring cropping, correct soil pH, etc
- Am I applying it correctly?
  - Good application technique is critical to reducing drift



*Water bodies are a really important indicator that provides a good sense check for farms, whether it is through soil erosion, chemicals washing off, or turbidity in streams.*

farmers and agronomists.”

The Voluntary Initiative plays a hugely important role in facilitating collaboration between water companies, regulators, pesticide manufacturers, growers and agronomists, adds Phil Jarvis, VI's chair as well as chair of farming and environment at Albanwise.

“When a water company highlights concerns, we can help with various solutions, such as digital technology, knowledge trails, annual training events and targeted catchments to solve the issue.”

Phil suggests it is important for those communications to reach agronomist, farm manager and sprayer operator. “They can sometimes be the same person, but often it is three individuals. They all have a part to play in planning and managing applications, through to actually applying and cleaning up after, whether it's the sprayer or disposing of spray cans.”

A lot of credit for the progress made in protecting water should go to farmers, stresses Jon Williams, public and government affairs manager for BASF. “Farmers are looking at changing farming practices to build resilience into soils, while Sustainable Farming Incentive and Environmental Land Management schemes are also helping and encouraging farmers to protect water.

“Farmers are thinking this way because they know if we're not careful the pressure will come on current tools, whether from water companies or regulators, and that will have only one outcome — a downward pressure on food production.”

Building resilience into soils is a key aspect of reducing the likelihood of pesticides reaching water, as well as having a huge number of production benefits.

“We're all duty bound in agriculture to look at how we can build the required resilience in soils,” Jon adds. “At BASF we have Project Fortress at The Grange in

Northamptonshire looking at how we can supercharge the soil and slow down that water transfer.”

Understanding the functionality of soils is definitely helpful, Phil says. “Improving soil health delivers a number of benefits, one of which is managing water, and what comes out of fields.”

## Fundamental changes

It's also part of how farms will transition from today's practices to where they need to be in five years' time, Jon interjects. “Soil health and structure changes are not practices that are taken lightly on farm — it's fundamental changes, for example, in cropping, cultivations or taking land out of production.

“And it doesn't just slow down water but builds resilience to climate change.”

Climate change could potentially affect the availability of water in different regions.

“That could change farming practices across the country,” he suggests.

Project Fortress trials at The Grange over the past three years, which compare business-as-usual arable cropping with rotations with cover cropping and herbal leys integrating livestock, have demonstrated that if farming practices change, soils can become healthier and retain more water, he says.

The Grange projects are just one part of BASF's investment in water stewardship and related activities, Jon notes. A second partnership on a farm near Rawcliffe Bridge in Yorkshire has long allowed water stewardship and other sustainability discussions with stakeholders.

“We're very keen to bring other parties into these conversations,” Jon says. A recent example was a water day held in the summer that brought the Environment ▶

## Technology available

Pulse width modulation and other precision application technology is available that can reduce the risk of pesticides getting into water as well as providing other application benefits, Jon says.

“It helps farmers know precisely where they have applied and where they can reapply products.

“But it can be expensive, and it's important that solutions are economically viable,” he stresses. “You can build a farming system that minimises the risk to water, but if it is not economically viable system, farmers won't be doing it.”

Not all solutions need or should be expensive, Phil notes. “Expensive bits of kit won't be for everyone. If you're a small grassland farmer, some of those types of things won't ever come across your radar.

“You might only spray once a year, but there are loads of things you can do to keep your



*“Not all solutions need or should be expensive,” says Phil Jarvis.*

sprayer maintained, products away from water courses when you fill up, and have mitigation in place, such as spill mats, if things go astray.

“It's simple things you can do without technology and the challenge is make sure those messages go across the whole spectrum of sprayer operators.”



*"Farmers are thinking this way because they know if we're not careful the pressure will come on current tools," says Jon Williams.*

► Agency, the VI, Anglian Water, distributors, agronomists, farmers and spray operators together to discuss protection of water.

"We all have our challenges, but we want to protect water and the wider environment," he notes. "But it is only when we actually come together that we can make the biggest impact in addressing those challenges and working collaboratively."

An example is the feedback BASF has received for a planning and mapping tool developed as part of the 'Know the Bentazone Risk' initiative.

The initiative, a collaboration between Better Bentazone Together group members BASF, NuFarm and Sharda International, started in 2021, after Environment Agency data highlighted the pea, bean and potato herbicide, bentazone, was the most frequently detected approved pesticide in groundwater and increasingly being also found in surface waters.

"The Better Bentazone Together group provides good stewardship advice about how to keep bentazone out of water, which is very much related to high-risk areas," Jon explains.



*Building resilience into soils is a key aspect of reducing the likelihood of pesticides reaching water, as well as having a huge number of production benefits.*

"The mapping and planning tool provides guidance on where you can and cannot apply bentazone, but we're reviewing the tool following discussions with stakeholders. The aim is to make it smarter and easier to use for end users."

## Data tool

It's not the only digital tool BASF has developed to help farmers and advisers with application timing. The 'wHen2g0' was developed in conjunction with Agri-Tech Centre, Agrimetrix, which connects disparate data sources to harness the power of big data and advanced analytics.

The tool evaluates a combination of soil type, drainage, cultivation method and weather to provide an eight-day forecast with a traffic light system to indicate the optimum timing for the least risk to water when applying the oilseed rape herbicides metazachlor and quinmerac.

"Again, it's making sure the products are actually maintained within the field and not running into water," Jon says. "The collaborative bit is making sure a wide audience is aware of the tool and why they should use it. It's about education and knowledge transfer to ultimately protect water."

Reaching a wide audience isn't always straightforward, Phil notes, although he is encouraged by the response from industry meetings earlier this summer. "We've had about 15 follow ups from organisations wanting to take what they heard further. That includes farmers, water companies and manufacturers, so from any embryonic 60 attendees that's snowballed into something much bigger."

Wider stakeholder engagement is crucial as it provides larger outreach to different end users, Jon adds. "We can then have that collaborative approach where the challenges can be shared and we can try to address them in unique ways, whether it is directly on farm with advice, or through improving agronomists' education levels to understand how certain compounds act and can explain that process."

Ultimately the key is to reach sprayer operators who actually put this into practice, Phil adds. The VI oversees the running of the National Register of Sprayer Operators (NRoSO), with scheme administrator BASiS. It is an important route to influence and encourage best practice.

"But we have to find other ways to engage them. As very practical people, you have to choose carefully when you will get their attention. It's not likely to be in the middle of lambing, silage making or harvest.

"But if you can combine it with something else, for example the BASF days, that can be more successful. Winter is another key period, when farmers do attend more knowledge transfer events."

The VI is putting a particular focus on water stewardship this autumn and winter, he adds. "There will be knowledge trails at events, while the NRoSO annual training event will include lots of water protection training. All sides want to see progress, and it is one of the strategic aims of the Voluntary Initiative."

In the longer term, the increased focus on integrated pest management should also help boost water protection on farm, adds Dr Neal Evans, director of operations for the Voluntary Initiative.

"We were buoyed by the inclusion of the IPM 1 standard in SFI," he says. "It encourages farmers to discuss with their agronomist their IPM strategy and plan for the next 5-10 years, reviewing that on an annual basis."

IPM offers the potential to mitigate or reduce the use of pesticides, making sure they are only used when needed.

Two tools have been developed with VI involvement to help with IPM planning and implementation. The VI IPM plan developed with the NFU which offers a broad whole farm approach to IPM, while an IPM Planning tool developed by ADAS and SRUC allows a more in-depth analysis of specific weed, pest and disease threats on a field-by-field and crop specific basis. ■

To help growers get the best out of technology used in the field, manufacturers continue to invest in R&D at every level, from the lab to extensive field trials.

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CPM would like to thank BASF for sponsoring this Research Briefing and for providing privileged access to staff and material used to help bring it together.



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## Beneficial beetles

# The good guys

Aside from the notorious oilseed rape munching variety, beetles mostly act as beneficial predators. CPM learns more about carabids and what they can offer, from weed seed consumption to slug control.

By Janine Adamson

**In the world of arable farming, there's one type of beetle which hogs all of the limelight, namely thanks to its penchant for gorging on a valuable break crop. However, there's much more to this family of insects than first meets the eye.**

From weevils to ladybirds, a long list forms the order Coleoptera, otherwise known as beetles. But one specific type is commended for its beneficial activity in field agriculture — carabids, or ground beetles.

With long legs and powerful mandibles it could easily be argued that carabids make for elite predators — whereas the adults hunt for insects at ground level and sometimes climb foliage, the larvae burrow and feed on soil-based pests. And certain species aren't fussy at all, sometimes divulging in an omnivorous diet including weed seeds (seed predation).

Entomologist Dr Kelly Jowett from Rothamsted Research has completed a PhD on the modelling of carabid beetle distributions in farm landscapes, looking at

their role as natural-enemy pest control. She says she often describes them as the hyena of the beetle world.

"In farmland, carabids eat a range of crop pests from aphids to slugs which makes them the ideal control agent. There are around 30 species found in British farmland, which demonstrate different behaviours and environmental tolerances."

### Effective control

"Not just an abundance, but also a diversity of carabid species may be key to effective pest control. To boost numbers we have to provide areas to feed, breed and shelter, while a diversity of crop and non-crop habitats will encourage a range of species," she explains.

In terms of areas to feed and shelter, this involves familiar features of many farming landscapes – beetle banks, conservation headlands and flower margins. "Semi-natural areas are important to provide the invertebrate and plant resources for all-year-round food.

"These resources should be close to productive areas so carabids can move quickly into the crop to eat the pests they prefer. Better yet, providing resources in crop areas by measures such as undersowing or companion cropping may encourage them to spend more time in field centres," says Kelly.

When breeding, carabids lay their eggs in the soil which hatch into larvae before pupating and emerging into adult beetles. Not only do the larvae remain active in winter, but because they require a lot of protein to grow, they predate on more pests than the adults. "To help larvae to develop undisturbed, minimum or low tillage systems

*“In many ways they're the background heroes, playing a pivotal role in ecosystem preservation.”*

may be useful," explains Kelly.

Research has been taking place to further understand farmland carabid behaviour through a number of projects delivered during the past 20 years. Dr Ben Woodcock from the UK Centre for Ecology & Hydrology (UKCEH) says although farmers have long been aware of the importance of beetles and other predatory invertebrates, what's been missing is how this translates to a measurable result to inform management decisions. ▶



*In farmland, carabids eat a range of crop pests from aphids to slugs which makes them the ideal control agent, says Dr Kelly Jowett.*



*Ben Woodcock believes the future lies in a data-driven approach to beneficial insect management.*

► “It’s been important to try and understand whether boosting the numbers of ecosystem service providing insects, such as carabid beetles, can have a positive impact on crop yield and profit margins,” says Ben.

To illustrate, in one UKCEH trial at a 900ha conventional arable farm, 0% (control), 3% or 8% of land was taken out of production and converted to wildlife habitats such as flower field margins and corners. The five-year experiment showed that while establishing field margins has clear benefits for wildlife, the availability of precision yield mapping means changes in yield resulting from beneficial insects can also be evaluated.

“In the control fields, where no attempt was made to support beneficial insects, yields remained consistent over the five-year period. However, where 3% and 8% of land were used to support populations of predatory insects, parasitoids and insect pollinators, yield gradually increased.

“It took 3-4 years, but after this, yields were on average higher than that seen when compared with the control. This was true even when we accounted for the loss of land for habitat creation and shows that these systems are compatible with conventional agricultural practices,” explains Ben.

He believes the future lies in a data-driven approach to beneficial insect management using monitoring and thresholds, not dissimilar to conventional pest and disease management. “It’s understanding the land’s capacity to naturally control pests which can then inform management decisions.

“Knowing where natural predators are within the farming landscape and at what level helps to understand whether there’s the

potential to offset insecticidal intervention. Although beneficials can’t wholly solve an insect pest problem, they can offer a background reduction of risk that all farming systems can take advantage of,” says Ben.

Monitoring carabid beetles and their activity is something which has intrigued mixed farmer Becci Berry, and she’s now addressing that curiosity through involvement with the SLIMERS (Strategies Leading to Improved Management and Enhanced Resilience Against Slugs) project, led by the British On-Farm Innovation Network (BOFIN).

## Monitor populations

As a nominated ‘Slug Sleuth/Beetle Scout’, Becci will use pitfall traps to monitor beetle populations to compare with the slug pressure on her 365ha farm. This is useful information for the project because certain types of carabids are natural slug predators, namely the violet (*Carabus violaceus*) and black clock (*Pterostichus madidus*) species.

“We’ve had a beetle bank on the farm for around 20 years but it’s been left alone with minimal management. I’m keen to improve my beetle knowledge so involvement with SLIMERS may help to tweak the bank and make more of that resource,” she says.

Becci is also looking at other ways to maximise biodiversity through optimising the farm’s shelter belts and flower margins. “There’s so much we can’t change at the farm such as soil type, it’s important to instigate the changes we can control.”

Beyond their scope as crop pest predators, carabids play a valuable role in the food chain in their own right, being consumed by farmland birds and small mammals. Professor John Holland says this has an additional knock-on effect. “Around 90% of weed seeds are eaten by mammals, birds and insects.

“Skylarks and grey partridge in particular eat beetles and this is where habitat management can contribute — maintaining more open areas such as the SFI arable plants option (cultivated martins and plots for arable plants), to help the birds to find food,” he says.

John believes as with pollinators, providing a wide range of environments is an effective approach for boosting beetle populations. “Beetles can be very specialised and prefer certain habitats, whether that be an open structure or scrubby grasses and shrubs. Even woodlands and deadwood stacks can prove beneficial.

“The greater the diversity of habitat, the greater the chance of a diverse and robust

beetle population. It’s also important to remember that populations of individual species can be cyclical — high in one year and lower the next while also varying in their distributions between and within fields. All of which demonstrates the importance of diversity to compensate for this inconsistency.”

According to John, because less is known about Coleoptera, they aren’t always appreciated. “In many ways they’re the background heroes, playing a pivotal role in ecosystem preservation. Carabids are also capable of conducting specialist pest control, locating patches of prey and destroying them as shown in a number of studies conducted by the Game and Wildlife Conservation Trust (GWCT),” he says.

To help to improve understanding, Kelly is involved with further work to make the identification of carabids easier, including publishing an ID guide and a new smart phone application, the latter of which is in development stage.

These tools are being created because a survey undertaken by Rothamsted Research indicated that farmers would be willing to monitor beetle activity on their land if they had relevant supporting advice.

But equally, Kelly says there is plenty of work left to be done. “If we can better understand which habitats are most beneficial for different beetles, it’ll be possible to tailor farmland habitats to ensure a good selection of predatory species that suit a farm’s particular pest problem.”

Farmers can take part in beneficial beetle research in the AgZero+ project and help to gather this data while learning more about carabids on their own farm. For information, visit <https://agzeroplus.org.uk/tools-farmers> ■



*John Holland says providing a wide range of environments is an effective approach for boosting beetle populations.*



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## LAMMA preview

# Machinery giants

**LAMMA 2024 is shaping up to be a good one, with a host of big-name manufacturers returning to the show. CPM takes a look at what's in store.**

*By Melanie Jenkins*

**LAMMA is once again set to kick-start the 2024 machinery show season. The line up of exhibitors this year includes the return of leading farm machinery brands JCB, Case IH, and Massey Ferguson, rejoining regular exhibitors Same Deutz-Fahr, Merlo, Krone, Valtra and Fendt at the NEC Birmingham on 17-18 January.**

With many manufacturers announcing that their latest models will be making their UK debut at the event, visitors will get the chance to see the latest in machinery and agri-tech. LAMMA's event director, Sarah Whittaker-Smith is pleased to have a wide range of big machinery brands returning to the event. "We'll have more to share later this year, but 2024 is stacking up to be one of our best yet. We can't wait to open the doors

of the NEC once again to welcome new and returning visitors."

According to Massey Ferguson's Lindsay Haddon, there have been a high number of requests from both customers and dealers for Massey Ferguson to return to LAMMA. "We've some exciting new products to launch, including the UK premiere of our new flagship tractor, this seemed like the perfect opportunity."

### **New Loadall**

The firm will be bringing along its recently launched 9S for the tractor's UK debut. The new series consists of six models ranging from 285hp to 425hp which are equipped with the Dyna-VT transmission.

JCB will also be showcasing several machines which will make their UK debut at the show. The company recently launched two new telehandlers, firstly the Loadall 542-100, which has increased lift capacity, and secondly, a higher power version of the Loadall 560-80.

"We'll be at LAMMA in 2024 with our best-ever range of agricultural machines for productive farming and contracting," says JCB managing director, John Smith. "We're looking forward to having face-to-face conversations with existing and potential customers as we present an exciting line-up

of existing and new machines."

Valtra is back at LAMMA with its new flagship, the 6th generation S Series, which will be unveiled for the very first time in the UK at the show. According to the firm, the tractor, which is dubbed the 'BOSS' is its most powerful tractor for operators who expect high torque, efficiency and a low total cost of ownership.

As well as the new S Series, see Valtra's entire range from its award-winning 5th generation A, G, N and T Series tractors to the Tractor of the Year 2023 Finalist and winner of the Farm Machine 2023 Jury Award — the Q Series.

The New Holland team will be back at the show with a bang, bringing along its CR11 combine. Designed for high-capacity harvesting, this combine, which won the Gold Medal for Innovation at Agritechnica 2023, has a 775hp C16 engine and 5x61cm rotors.

Other new products to look out for include the T7.340 HD with PLM Intelligence, the new flagship model for the New Holland T7 tractor range which extends the maximum performance of the T7 Heavy Duty line to 340hp. The T7.225 will also be on display, along with the T5S with loader and the T6.180 Methane will be in the demo ring with a Kongskilde Diet Mixer.

Claydon will exhibit the latest version of its Hybrid T trailed drill. The model on display will be a 6m which will be equipped with split placement of fertiliser on the front and seeding tines, a 5500-litre hopper divided 60:40 between seed and fertiliser, standard 175mm A-shares, front row metal boards, stone protection, light and vision kit, seed blockage sensors and air brakes.

Visitors will be able to see an updated version of Grange Machinery's Strip-Till Preparator. The latest iteration has wider working widths and includes a range of options to tailor the operation to suit conditions and crop requirements. The firm will be unveiling a 6m machine to add to its current line-up of 3m, 4m and 4.5m models.

Three independent rows of 450mm diameter cultivation discs can be hydraulically adjusted while working in harmony with our low disturbance tine and point, which creates an ideally cultivated row that is ready to plant into, explains Grange's Rhun Jones. "The seedbed is then finished with a zonal Guttler prism roller ring which breaks down any clods that have flowed through the system as well as consolidating the row in readiness for a planter."

On display for the first time at LAMMA will be the new Hi-Spec PD20 Push-off Dump Trailer that uses the same technology originally designed for the company's larger Kompactor range of push-off trailers.

Unlike conventional tipping dump trailers, this one — which has a carrying capacity of around 20t — is offloaded using a hydraulically operated moving floor type

headboard that clears the load from the body once the up and over tailgate has been raised.

Also on display will be a K36 Kompactor Push-Off trailer. The Kompactor features a hydraulically operated headboard powered by a triple hydraulic ram system, that can be used to compact material such as woodchip and grass or maize silage.



On display for the first time at LAMMA will be the new Hi-Spec PD20 Push-off Dump Trailer.

## Muck spreaders

Bunning is set to use the show to launch its new spreader range which consists of four new models - the Lowlander 120, 120 Compact, 150 and 150 Compact.

The new Lowlander 120 Compact Narrow HBD spreader will be on the stand and features a narrower body to achieve lower application rates while retaining the two 1100mm spinning discs as ▶



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JCB will be showcasing several machines which will make their UK debut at the show, including the Loadall 542-100.



LAMMA will host the internationally acclaimed gaming series Farming Simulator's first ever UK esports league.



New Holland's CR11 combine has been designed for high-capacity harvesting, boasting a 775hp C16 engine and 5x61cm rotors.

► standard on HBD machines.

"The Narrow spreaders will appeal to users wanting to run wider tyres to reduce compaction but keep within a 3m road width

and allows lower applications rates to be applied due to a narrower aperture," explains Ben Johnson of Bunning.

Also on show will be Bunning's largest Lowlander Widebody range. The 250 HBD is a 25t rated spreader capable of carrying 26m<sup>3</sup> and sits above the current largest UK machine, the 230 HBD. It features a 200mm longer body, a full chassis construction, and the option to increase carrying capacity to 31m<sup>3</sup> with side extensions for light products such as compost.

## Inter-row hoe

KRM will be showing a new model of fertiliser spreader — the L15W with weigh-cell technology — along with several upgrades to the existing range, which includes a new headland spreading solution for wider widths to its M line of spreaders.

The company will also be bringing along a mechanical inter-row hoe and a camera guidance system which will expand its range of mechanical weeding solutions from European firm, Carré. The Klinea is an inter-row hoe purely dedicated to cereals. It features parallel linkage mounted elements to ensure a constant working depth over the whole width of the hoe thanks to the oscillation of its parallelogram and its independent ground wheel.

Learning and knowledge exchange will

also take centre stage at the show. Visitors will have the chance to hear from leading and innovative voices in the LAMMA Live theatre. Agreena's Thomas Gent will unravel the enigma of carbon farming, with further insight from organisations such as LKAB Minerals and FarmPlan. As before, CPD points will be available for members of BASIS, NRoSO and DairyPro.

The popular Demonstration Arena will also be making a return after its debut in 2023. Set to feature a programme of daily demonstrations from the like of Case IH, New Holland, Valtra, Merlo and Frontier Ag, visitors can expect to see a range of machines in action first-hand.

From the glitz of shiny machines to the gaming world, the coming show will host the internationally acclaimed gaming series Farming Simulator's first ever UK esports league.

The world of esports may be new to some in the industry, according to Sarah. "But we know that a lot of farmers are also gamers. With more than 150 farming brands and big machinery names also getting involved, LAMMA is a great place for Farming Simulator League's first UK event. This competition brings something totally unique to the show, and we can't wait to put it in front of a new audience."

The Farming Simulator League event will take place across both days of the show, with teams of three players each competing live from the League Theatre in the NEC, aiming to survive multiple knock-out rounds to reach the final.

With more than 30M units sold worldwide, Farming Simulator is a genre-leading game. The 22 edition of the game features more than 150 agricultural brands like Case IH, Fendt, Massey Ferguson, New Holland, and Valtra. The series celebrates its 15th anniversary in 2023, and since its launch as a niche product for farming enthusiasts, it has developed to include multiplayer mode, mobile and console versions, esports, and most recently crossplay-multiplayer ability. Users are also able to create their own modifications to the game, with 2.5bn 'mod' downloads over the course of the series.

"Farming Simulator is about growth — and with our attendance at LAMMA, we continue to cultivate our international presence and even put new seeds into the soil by expanding the Farming Simulator League. We're very happy and look forward to meeting new interested farmers and players in the UK," says Boris Stefan, of Giants Software. ■

## Young Engineer Award

The LAMMA show and the Institution of Agricultural Engineers have partnered up for a third successive year to announce the 2024 Young Engineer Award, showcasing the best of young engineering talent whose work helps UK farms to be more productive and sustainable.

"The rapid pace of innovation in the ag sector emphasises the importance of celebrating achievements of young people in our industry," comments Charlie Nicklin, Institute for Agricultural Engineers CEO. "Supporting young innovators not only gives them market exposure, but it also highlights what a great career engineering in agriculture can be. It gives me great pleasure for us to support the 2024 Young Engineer of the Year award at LAMMA."

Daniel Broderick won the 2023 Young Engineer Award for his Cubi-Clean machine, which makes the process of cleaning dairy cow cubicles quicker and easier.

"The Cubi-Clean was the result of ten years hard work, so it was great to receive recognition from both the judging panel and the public,"



For the third year, LAMMA will host the Young Engineer Award which was won by Daniel Broderick at the 2023 show.

says Daniel. "Winning the award has certainly helped with product awareness in the UK market."

Those interested can find more details and the application at <http://www.lammashow.com>. Entry is free, both individuals and companies are eligible to apply, and the award is open to engineers 35 years of age and under as of 1st January 2024.



# Eye in the sky

**“ We are already starting to use drones with our customers to effectively identify early indications of potential localised problems. ”**

locations, says Thomas.

“We can now set out a map for the field or plot and can go back to that location knowing that the drone will take the same amount of imagery at the same resolution, height and speed, so we can build an accurate assessment of changes along a specific timeline.

“We can, for example, use a specific drone equipped with a multispectral lens so we can put that into software and look at the canopy coverage of spring barley plots to see the rate of establishment by the density of the canopy.

“We can then utilise a wide range of visual filters and select the one that gives us the most information,” he says.

“In other crops, such as spring beans or maize, we might want to count the number of plants because that will give an overall performance of establishment by providing actual quantitative data.

“We can then use a different drone using a standard lens to collect red, green and blue (RGB) maps to analyse. It could be we see a particular treatment producing better germination than another and this can be demonstrated as a visual journey as the crop develops.”

Several field-scale trials can also be run on-farm simultaneously to establish the best combination of inputs and management for that particular location, adds Thomas.

“We can run varietal plots in one area, have fungicide trials on the other side of the field, and then in the middle we’ll often have nutrition plots. We can collect a huge amount of data in each flight and this builds over the season. ▶



*Andrew Lowe has already seen savings in fertiliser of over 30% on high-yielding crops of Group 4 wheat at White House Farm, Bozeat, Northamptonshire.*

## Drone technology

**Drones may not be new to the industry but they are becoming increasingly sophisticated and are being utilised for more and more operations as the technology improves. CPM investigates.**

*John Swire*

**New aerial assessment techniques being rolled out by Agrii using image capture from drones can help growers significantly increase productivity and optimise input use, says the company’s crop input specialist Thomas Perrott.**

Achieving better nitrogen use efficiency, controlling weeds more effectively, identifying the extent of disease problems and quantifying the yield impact of different weather conditions, are just some of the wins now being achieved, he says.

“Drones in themselves are no longer new, but what is changing rapidly is the accuracy of imagery collected and the software around this that enables data to be visualised and analysed in completely new ways.”

### Significant equality

Agrii has invested significant equity into Drone Ag, Jack Wrangham, Drone Ag’s CEO, says: “Agrii’s investment in Drone Ag will not only help us accelerate the development of our technology but will also enable us to provide even greater value to our customers. Agrii will be able to leverage our technology to deliver more accurate, efficient, and sustainable crop management services to its customers.

“With Agrii’s support, we can continue to develop our technology and help farmers improve their productivity and profitability. The investment from Agrii is a significant milestone for Drone Ag, and we look forward to collaborating with Agrii to create innovative solutions that will shape the future of agriculture.”

The biggest advantage drones provide is the consistency and continuity of data, achieved through the growing season by facilitating accurate assessments on a regular basis at precise, repeatable



*"Drones are set to be a transformational technology in agriculture over the next few years," says Jonathan Trotter.*

► "We can then discuss with growers how they can achieve a really strong crop as quickly as possible with the least number of inputs, so they know they have the best foundation for yield as the season progresses."

A lot of the work now being carried with drones at a farm level is, in fact, around crop nutrition, he points out.

"We know that placement fertilisers are a good way of laying down a sound foundation for growing crops, but there is now a new research journey emerging around this," explains Thomas.

"What are the best options, where's the best placement, what else can we put down the spout these placement fertilisers and is there a benefit of adding micronutrients such as zinc, boron and molybdenum to the base fertiliser?"

With so many new products coming onto the market, Thomas believes there's still a huge amount to learn about whether they live up to their claims and how they can be fine-tuned.

"Products can be nutritional biostimulants, or they can be 'soil amendments' of some description. These have an effect on how the soil's biology reacts to the nutrition applied, as well as how nutrients get into the plant," he says.

"One of the most promising of these, and one where drones are playing a key role in evaluating, is a new sustainable organo-mineral fertiliser called Fortis OMF, which looks like it could be a real alternative to traditional NPKS compounds.

"It's a 12-4-4 organic pellet that is broadcast ahead of the drill and contains 70% mineralised N, which is available to plants as soon as they emerge."

Thomas believes it's a 'best of both worlds' product that has a benefit to soil

health because it delivers such a high amount of organic matter, as well as delivering nutrition. Every 1t/ha applied provides the equivalent organic matter as 4t/ha of FYM.

"The drones are allowing us to conduct full-scale field trials on this instead of the micro-plot analysis we traditionally would have undertaken, so we are really excited about this and confident some really meaningful results will be forthcoming shortly."

According to Agrii's lead pilot and technology trial manager Jonathan Trotter, drones are set to be a transformational technology in agriculture over the next few years.

"The potential is huge. We are already starting to use drones with our customers to effectively identify early indications of potential localised problems, such as nutrient deficiency or pest infestations, before they become a major problem.

"As well as leading to more precise applications of fertilisers and pesticides, these are saving growers' time, money and labour, as well as delivering significant environmental benefits. But it really is just the tip of the iceberg," says Jonathan.

## Larger payloads

"There are so many possibilities including swarms of drones applying specific agrochemicals to crops, as well larger individual machines capable of carrying larger payloads, all controlled remotely and working with real-time data at an individual plant resolution.

"The issue moving forward is not really the potential of the technology, but ensuring it aligns with the legislation surrounding it and, to a degree, helping shape this."

Which is precisely why Agrii is putting itself at the very centre of this process and working closely with the Civil Aviation Authority (CAA) and other key bodies to establish safe working practices and operational strategies for the future, he says.

"We want to explore what is going to be possible and make sure it complies with all guidelines and legislation so growers and the wider industry can get the most benefit out of it."

Northamptonshire grower Will Green believes drones could be the most important piece of technology he has seen in his near 40 years of farming.

Working with Agrii agronomist Andrew Lowe, he has already seen savings in fertiliser of over 30% on high-yielding crops of Group 4 wheat at his White House Farm, Bozeat, near Wellingborough.

"We would normally stick pretty much

to RB209 recommendations for fertiliser applications, which said we would need to apply 220kgN/ha to achieve our target yield in 2022," he explains.

"Using the drones estimate of GAI and linking this back to our SMN tests, the Agrii system said we should need a total of 150.75kgN/ha in one particular field, so this is what we applied over three splits in March, April and May 2022.

"On two other fields, the recommendations came out at 152.43kgN/ha and 162kgN/ha. So the average savings ranged from 57.5kgN/ha to 69.25kgN/ha, which is pretty sizeable considering the cost of nitrogen at that time.

"Highest yield came in at 9.4t/ha, pretty much the best we ever get here, with an average of 8.25t/ha which, considering the massive savings we saw in fertiliser costs, was a great result."

The previous year saw fertiliser savings of up to 50kgN/ha, so Will is pretty convinced of the robustness of the system.

"It's really useful for giving an overview of your crops, too. You can spot where drainage issues might be starting and be able to do something about it, as well as maybe paying particular attention to soil structure in those areas.

"Weed mapping is something we would like to get into eventually and the drones are also really useful in checking out dense crops, such as oilseed rape and beans, as they develop."

But the best is yet to come, he believes.

"I keep thinking about the evolution of the tractor from an engine on wheels to the computer-controlled, auto-steering and highly sophisticated machines they have become.

"I don't think anybody at the time of their introduction would have any idea of how much impact they would have on how we farm and I feel drones are in the same category.

"We're only just starting the journey with them, and the next 20 years will see a revolution in their use." ■



*The drones are allowing full-scale field trials instead of the micro-plot analysis traditionally undertaken.*



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## Southern Counties Farming & Machinery Show

# Roll out the robots

The first Southern Counties Farming & Machinery Show opened its gates to visitors at Newbury Showground in November and *CPM* attended the inaugural event to hear how robots have transformed one East Anglia based farm.

*By Melanie Jenkins*

**Machinery might have been the focus at the show, but the future is likely to include the increasing presence of robotics.**

Speaking during one of the seminar sessions held on the day, Andrew Williams detailed how robots had helped to transfer operations at Home Farm, Nacton in East Anglia, while he was farm director there.

Although Andrew stepped back from this role earlier this year (2023), he has stayed on as an advisor and was integral to the adoption of robots in the day-to-day operations in 2021. The tenanted farm consists of 1950ha of arable and vegetable production near the river Orwell, where the land is light and so heavily irrigated. Cropping is diverse, consisting of 30 different crops, including onions,

potatoes, brassicas, cabbages, cauliflower, winter barley, winter wheat and vining peas.

Around 10% of the land is farmed organically and this is what really drove the move into robots, says Andrew. "There's a lot of labour on the farm, with around 50 employees in total, 20 of which are field staff who hand plant, rogue and harvest crops. Since Brexit, the challenges sourcing labour have been exacerbated and so we decided to explore the opportunities presented by robotics."

### Juggling jobs

"We were also struggling to get in as many passes as we wanted with the weeding hoe and comb harrow during the early stages of crop development, as well as managing the pressures of irrigating these crops and juggling harvest alongside weeding in July, August and September," he explained.

While weighing up the financial viability of continuing to grow certain crops, such as organic onions, it came to Andrew's attention that there was a commercially available robot that could weed crops and reduce the requirement for manual labour. "We got in touch with the Agrobot team in Denmark who had created Robotti. The engineers in the team had farming backgrounds, so they understood the challenges that we faced."

The farm took ownership of its first Robotti in April 2021 and the comb harrow

*"If it weren't for introducing the robots, we wouldn't be growing organic onions anymore."*

was adapted to work with it. "To all intents and purposes the Robotti is an autonomous mini tractor with a three-point linkage, hydraulic system and a PTO. It



*Andrew Williams introduced robots to Nacton Farm to help make crops financially viable and deal with labour shortages.*

# Southern Counties Farming & Machinery Show

runs off two Kubota engines — one on each side — and can operate for 26 hours on one tank of fuel. One engine drives the three-point linkage and propulsion and the other looks after the PTO and spool system.”

Work plans are compiled using maps on an iPad and the user can indicate where they want the robot to lift up and put down, as well as turn. Maps are directly emailed to the machine and once started it'll then carry out the task.

The Robotti has been fitted with a number of safety features, including a red stop bar and a LIDAR system so that it'll slow down if an object comes within 3m of it and will come to a complete halt when this reduces to 1m. “It has a fail-safe for about every situation but sometimes this has kicked in in response to dust clouds, but a software patch has now solved this issue,” explained Andrew. “We can monitor it using a mobile but it's still good to go and check on it throughout the day to ensure it's working well.”

The farm also decided to buy a small rotavator which could be fitted to the Robotti because it didn't have any work to do in the spring. “This allowed us to use the robot to destroy our organic cover



*The Robotti has been fitted with a number of safety features, including a red stop bar and a LIDAR system so it'll come to a stop if an object gets too close.*

crops by passing through them two or three times.

“We also adapted a slightly wider cultivator so that this can be used on the robot from November through to January in fields that were destined to be used for both conventional and organic potato production where we suffered with wireworm issues,” he detailed. “Wireworms

can bury themselves within one minute of being brought to the surface, so by having the Robotti disturbing the ground regularly, it allowed birds to feed on them more and we think it's helping to reduce the population of the pest.”

One of the biggest benefits of the robot is that it can run for 24 hours a day, said Andrew. “We can set it up to do repetitive ▶



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One of the biggest benefits of robots like the Robotti is that they can operate for 24 hours a day.

► tasks and it'll just do them over and over without requiring a break. It can be operated with a remote control, but if we have to move it down a road, we put it on a low-loader to transport it."

Since the farm's original investment, a newer version of the Robotti has been launched — the LR — which is double the width of the original at 2.6m. "Along with Kuhn, Agointelli has developed an implement that will hoe in between cabbage plants which has allowed us to eliminate the requirement for manual weeding. It also has just one motor and a larger diesel tank, meaning it can run for longer."

After having success with the Robotti, Andrew decided to invest in a FarmDroid robot. "This is solar powered and operates at a walking pace and is able to plant seeds using GPS. It records where every single seed has gone which means it can go back to the field later in the season and hoe in between the plants."

At the time of introducing the FarmDroids to the operations, the farm was growing organic fodder beet and onions which were proving difficult to

make financially viable. "We brought the FarmDroid to the business in an attempt to change this," he explained. "Initially we drilled 6ha of onions using it and had to plant three seeds per slot because the robot could only go down to a certain spacing. It was a slow process with weather interruptions and ended up taking us about eight days to do."

## Second robot

Once this was complete, he then adapted it to drill fodder beet. "It's recommended that each FarmDroid can cope with 20ha of fodder beet per year, but every time we changed between crops it took us half a day to adjust the robot. Subsequently, we pushed the robot too hard and ended up with a reasonable crop of onions and a dirty crop of fodder beet. So we decided to purchase a second robot.

"We now plant 8ha of onions using the one of the FarmDroids, which it then weeds until the crop gets too tall. At this point we set the robot to drill red beet and do the weeding in that. The second robot is tasked with drilling and weeding all the fodder beet," said Andrew.



The FarmDroids rely on a base station on the farm for data transfer and everything from seed spacings to how close the weeding knives get to the plant can be controlled.

The FarmDroids rely on a base station on the farm for data transfer and everything from seed spacings to how close the weeding knives get to the plant can be controlled. "The advice is to weed in one direction and then when the robot turns around, go back again."

Being solar powered, the FarmDroids usually run out of power by 11pm when used in March, so the farm has two sets of batteries for each, so that one can be charging during the day and swapped over with the dead battery at night. "But from mid-May onwards, one battery will run all through the night on the power it's gained during the day."

One limitation with the FarmDroids is that they can only drill small seeds, admitted Andrew. "But the firm is looking at the possibility of the robot being able to plant peas, beans, lentils and maize."

Of the two types of robots the farm has, he feels that the FarmDroid has been the most successful. "We've had very little trouble with them and very few crop losses. The Robotti has been more challenging because we adopted it at such an early stage in its development, plus it's faster and more powerful. We had one occasion with the mounted hoe where it jammed in one direction and wiped out some of the crop before we could stop it. However, at this point the Robotti and hoe couldn't talk to one another, but this has since been fixed, so now if there's a fault with the hoe then the robot will stop."

Before investing in the robots, the farm was spending about £1000/ha on hand weeding organic leeks and brassicas, but now, if the weather falls right, this can be reduced to zero, he said. "And even if we wanted to, we couldn't source this labour now. Additionally, if it weren't for introducing the robots, we wouldn't be growing organic onions anymore because the cost of production just wouldn't stack up. The FarmDroids are what's made it possible for us to keep growing them."

However, he feels that the Robotti is still a work in progress and the farm hasn't quite found the right niche for it yet.

Although Andrew hasn't seen himself as a pioneer when it comes to new agricultural technology, the early adoption of robots was something the business had to do to overcome the challenges it faced. "The successful adoption of this technology is also down to the attitude of the farm manager and the staff — without them being on board, it wouldn't be possible." ■



## Sprayer survey

# The value of tech

**Investing in a new sprayer can raise numerous questions around opting for various technological and safety options, but how are machines likely to evolve over the next few years? CPM takes a look at the key features and why they're valuable.**

*By Melanie Jenkins*

**Technological advances in sprayers often have cost and chemical-saving or safety elements behind their invention, but it isn't always simple to justify the investment.**

And with only 22% of respondents to a recent grower survey conducted by CPM and Kuhn saying they'd want to have additional technology on their next sprayer purchase, what is holding the remaining 78% back?

According to Kuhn's Edd Fanshawe, there could be a multitude of reasons, ranging from the cost to the understanding of the new technology available. "One response to the survey which I found surprising was that more farmers aren't interested in spot application and individual nozzle use. Although 55% are interested, there's a further 45% which aren't and we're surprised more farmers wouldn't be able to justify the investment because going forward the pressure to reduce or optimise chemical use is likely to increase."

On the face of the investment, Edd feels that it's the upfront cost of the technology that is likely deterring some. "But the more this kind of technology is used on farm, the more worthwhile and value for money the investment becomes in the longer term."

Although this kind of technology is well-known across the industry now, he feels that not many farmers and operators have been able to use or had direct exposure to spot spraying yet. "There's only a handful of sprayers in this country that have it fitted, so it might be that there's a lack of understanding about the difference having it can make to an operation."

### Software and hardware

Additionally, there's a lot of software and hardware required in a spot spraying system, which means development is likely slowed somewhat and then this links back to the cost, he explains. "But we're at the point where the concept is right, there just has to be more awareness about what it can achieve on farm so that farmers are less reluctant to adopt it. At some point spot spraying will be the norm and I think in 10 years we'll be seeing this technology on every new sprayer people buy because it's fundamentally about saving money and reducing chemical use."

Answers to the survey flagged that only 26% of respondents felt that individual nozzle control was essential, while 60% believed it to be optionally important and 15% felt it was unimportant. "Individual nozzle control will be most important to larger operations where there's a greater benefit from having this technology."

However, Edd had anticipated a more even split between those feeling the technology is essential and those who don't.

*“When we come to see this system widespread, there'll be minimal interaction between the operator and chemical.”*

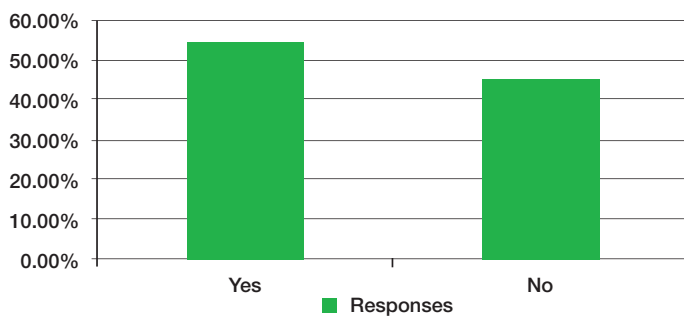
"There are definitely small margins to be gained by investing in individual nozzle control. Much like when adopting GPS it's helps to prevent any overlaps by a couple of centimetres and reducing wear, with individual nozzle control it means there's less chemical used if you're able to shut on any sections that aren't required. For example, you might have to spray a 1m section but because you don't have individual nozzle control you end up having to spray across a 4m section, meaning that's 3m of wasted chemical for that entire pass. Adopting technology such as this is all about understanding the cost benefits."

Further technology aimed at optimising chemical use and reducing costs comes in the form of boom levelling systems. "There's a good awareness of the impact boom levelling can have on operations, and with 78% of respondents to the survey rating it as essential it appears farmers and operators can see the benefits."

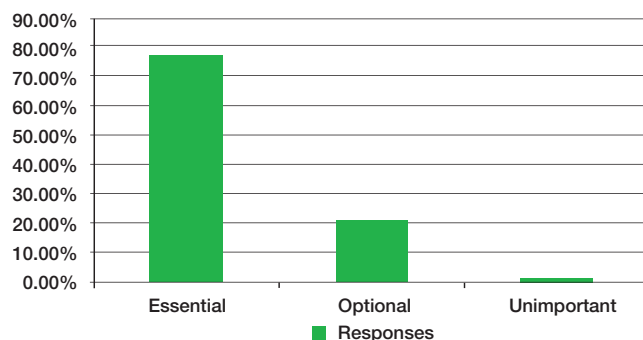
Those operating smaller boom widths — in the region of 12m — are less likely to see the benefits of investing in this technology, but for those operating wider widths, especially when using 24m or 36m systems, ▶

# Sprayer survey

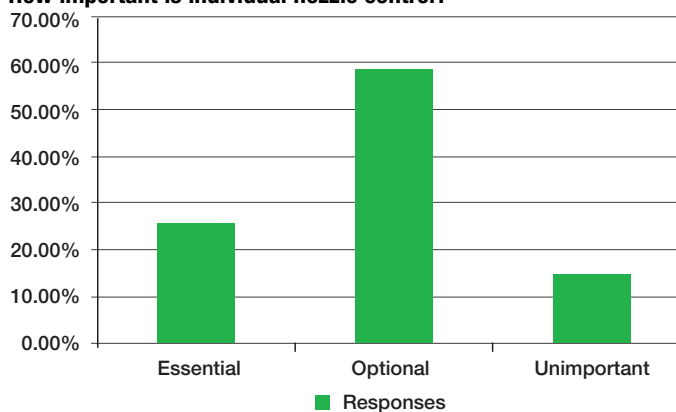
**If spot spraying technology to target individual plants was available, would you aim to justify this on your next sprayer purchase?**



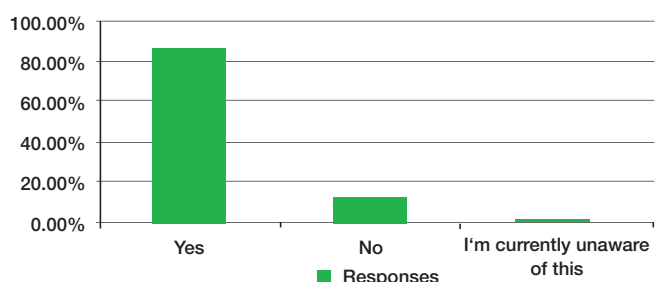
**How important is boom levelling technology to increase application accuracy?**



**How important is individual nozzle control?**



**Are you interested in using closed transfer systems to avoid chemical spills and protect the operator when filling up your sprayer?**



## Safety first

Safety when using and operating spraying equipment can't be undervalued, and closed transfer systems (CTS) have been designed to optimise just this.

Although most respondents to the survey (87%) were interested in equipping their next sprayer with a CTS, Edd was slightly surprised there were respondents who weren't interested in the technology. "A large majority of the respondents were either farm owners or managers and I do think that if more had been sprayer operators, the response would have been different again. Although the system is about improving safety and is likely to speed up chemical transfer, operators may think it'll slow them down."

The easyconnect CTS comprises of two main components, explains Adama's Jonny Oosthuizen. "The first part is a unique screw cap fitted to product containers and the second is a coupler which can either be fitted to the sprayer or connected to a separate frame in the designated filling area. The idea is that these two components work together and reduce the risk of spills."

A CTS coupler connects to the sprayer and negates the use for a classic induction hopper, he says. "In comparison with an induction hopper, using the easyconnect CTS means that product containers don't have to be opened in the tradition-

al sense, but instead the container is inverted and attaches to the coupler via the unique cap. The product is then delivered straight into the tank, so there's minimum operator exposure to the chemical.

"Not only does this make the handling of products safer for the operator and the environment, but it also means there are less points of potential contamination and no requirement to tip the products into the induction hopper. This process also makes chemical transfer quicker and once the container has finished emptying, the resealing is automatic, again minimising the risk of spillage," he adds.

Everyone understands that there are risks associated with chemicals, says Edd. "When we come to see this system widespread, there'll be minimal interaction between the operator and chemical."

Installing a CTS coupler doesn't require buying a new machine as they can be retrofitted, and if required, the unique caps on the containers can be unscrewed as normal so the product can be transferred to the sprayer in a more traditional manner, says Jonny.

Adama has been involved in a UK steering group for this technology since the early stages of its development and back in the spring the firm ran a



*According to Jonny Oosthuizen, closed transfer systems make the handling of products safer for the operator and the environment.*

pilot with its Arizona (folpet) product with CTS compatible caps on, he says. "We hope to roll out these caps on a wider range of our products so they're compatible with CTS systems but the speed of this will likely be driven by the uptake of the couplers within the industry. From Adama's point of view, anything that makes the handling of crop protection products potentially safer and faster is a positive thing."

Although CTS has been around for numerous years, it's still in the early stages in terms of on-farm uptake and there's no legislation in place that drives this. "Purchasing a coupler has a cost associated with it as does integrating the new caps into manufacturers' production systems, so this careful introduction gives the industry time to decide on which systems are most effective and work best."

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*Pulse width modulation allows users to adjust the droplet size from the cab and provides turn compensation so that there's an equal dose across the width of the boom.*



*Pulse width modulation allows users to adjust the droplet size from the cab and provides turn compensation so that there's an equal dose across the width of the boom.*

▶ the technology can make all the difference to accuracy, explains Edd.

"But boom levelling systems enable user to feel more confident going to wider widths and it might be the lack of having this technology that prevents them increasing their boom size. Because drilling width is so often dictated by sprayer width, introducing a boom levelling system might allow you to go wider than this.

"We're also seeing an increase in windier

## Winner announcement

Congratulations to prize winner Robert Heywood from Devon who responded to the CPM/Kuhn survey and provided an insight on whether a self-propelled sprayer with front mounted booms would be of interest and what the biggest benefits or drawbacks of this design would be. Robert won an Apple iPad worth £500.

He was chosen as the winner having completed the tie-breaker question, explaining that the ability to view front mounted booms in operation would be a big positive where there is undulating ground and it would provide peace of

mind regarding application efficacy.

Kuhn's Edd Fanshawe says the answer stood out because increasing application accuracy is something the firm is constantly looking at and understand it's a high priority for many users. "Although front mounted booms aren't popular in the UK currently, this answer proves that operators are willing to explore new practices and machine designs to improve precision."

To engage with future surveys, visit the CPM website and sign up to the newsletter.

days now than we have in the past, meaning there are fewer spraying days. But having a boom levelling system can open the spraying window wider and allow you to continue to work in conditions that likely wouldn't be able to otherwise.

## Boom levelling

"Boom levelling means sprayers can travel at increased speeds and still maintain accuracy, so efficiency is improved, both in terms of chemical use and the area it's possible to cover during the day. Additionally, there are a multitude of benefits aside from keeping the boom level, including reducing drift and improving accuracy of hitting targets."

Another well-established technology, pulse width modulation, again has more benefits when fitted to larger sprayers. This technology allows users to adjust the droplet size from the cab and provides turn compensation so that there's an equal dose across the width of the boom, meaning there

are no overdosed areas on the inside of a turn or underdosed areas on the outside, explains Edd. "These systems allow the exact amount of chemical to be applied arounds corners and on bends, irrespective of how fast you're travelling."

Responses to the survey highlighted that a number of businesses with 5000-6000-litre sprayers were interested in the technology but felt they couldn't justify the cost. "There might still be some hesitancy in the uptake of this technology where users haven't seen it in practice," says Edd. "But it might be the case that a number of farmers don't have the hectareage to justify the investment."

Edd believes that as farmers and operators see and experience more of the technologies on offer, the adoption will become more widespread despite the cost. "As the cost benefits and accuracy gains are realised, more and more farmers are likely to be willing to invest and in a decades time sprayers are likely to be even more technically capable than they are now." ■

## Adapting for cost-saving

Covering all aspects of agricultural contract work on Anglesey, off the north-west coast of Wales, Rhys Jones introduced a Kuhn sprayer to his operation in 2021. Previously he'd run a self-propelled Knight sprayer, which he felt was great but was better suited to situations where land is all grouped together. "As a contractor I'm doing a lot of road travel, so I wanted to get something nipplier," he explains.

Working across 2000ha per year on largely grassland, some maize and a smaller area of wheat and barley, he decided to purchase a mounted Altis 2002 with a 2000-litre rear and 1500-litre front tank. "We chose this because we could separate the water, meaning we could cover one customer and travel straight to the next

without necessarily having to go back to the yard to fill up."

Rhys kept the same boom width as with his previous sprayer, at 24m, but opted for aluminium gullwing booms as opposed to the steel booms he'd had before. "I was a bit apprehensive about switching to aluminium booms because I hadn't heard much about them, but now I'd never go back to having a steel boom. The aluminium is so much lighter there's a considerable weight saving."

One of the best features according to Rhys is the Diluset cleaning function which means the front tank can be cleaned separately to the rear tank and he can start cleaning both from the cab using the 170-litre front clean water tank and the 300-litre rear tank. "It's a really

handy element to have, especially when changing from a weed killer to a foliar fertiliser," he says.

Another feature Rhys was keen to get on the Altis was auto shut-off but in future he'd like to get full section control for each meter. "It's an expensive investment, so now the sprayer has seven sections.

He had been running four-cylinder tractors, but his year purchased a New Holland T7 225 to use for his sprayer operations. "The sprayer is a heavy piece of equipment, so I'm potentially looking to changing from a mounted to a trailed sprayer, but I'd stick with Kuhn.

"Overall, my working hours have definitely gone down because of the travel speed and due to being able to carry two products."





The Grenadier's sprays of mud are messy, but it's a good thing you're not driving it. The mud is just a byproduct of the vehicle's off-road capabilities.

## Off-road 4X4 test

# Testing the Grenadier

**Last September, CPM previewed the Ineos Grenadier and discovered the story behind it. But does it live up to all the hype? We get behind the wheel to put it through its paces and find out how it handles on and off-road.**

*By Mike Watkins*

**Nestled in a small yard at the picturesque Glanusk Estate near Crickhowell in Powys, several Ineos Grenadiers line up, waiting to be put through their paces. The dark skies are delivering rain and more rain, just what's needed to test an off-roader — some proper mud.**

Opening the solid feeling door of a pale blue Fieldmaster — specced with two-tone leather seats and safari roof lights — it makes a reassuring well-made clunk as it closes. It all feels familiar, no fancy electronics to adjust the seat — just lean down, pull the bar up and slide the seat back or forth, just like my own old

Series 2 Land Rover Discovery.

The whole premise behind the Grenadier has been to do away with the electronics that operate every aspect of modern 4x4s and, instead, go back to robust engineering that's fixable and won't leave you stranded and with a very high repair bill if the electronics go wrong. I like that about it.

### Good visibility

Checking the mirrors — nice big square things — I can see the sides of the car all the way to the back. The visibility is really good, and its lack of rear overhang means there would be no excuse for accidentally reversing into something back home in the yard. The professional driver sitting beside me, Cameron, asks if I need to adjust the passenger side mirror and begins to lower his window — even the mirrors are adjusted manually, which might not have been that handy if he wasn't sitting in the passenger seat. You can't see much using the rearview mirror because of the way the rear door is split, but it's not a problem as the side mirrors and big windows more than compensate.

Heading out of the estate, first impressions are positive. The Grenadier's boxy shape means you can see the tops of the front corners, so you know where the

*“It's a vehicle I can imagine growing old with rather than trading in before it becomes too expensive to keep.”*

wheels and body are — useful in a farming environment. It's smooth and very easy to control the throttle and power delivery. So far, it's feeling very civilised.

Gently dialling in the power, the eight-gear auto box is smoothly going up the gears and Cameron says: “It's a good straight down here, you can test the acceleration if you want?” If you want? No second invitation required, a healthy push on the throttle and the three-litre, straight six BMW engine changes from a gentle purr to a deep throated growl. The power kicks in and I'm taken a little by surprise, big lumps of 4x4 are supposed to accumulate speed gradually but the Grenadier properly shifts.

The petrol engine is capable of 0-60mph ▶

# Off-road 4X4 test



Amongst the helicopter-type switch gear, the old-school handbrake and gearstick for the two-speed transfer box, the slick BMW-styled gear lever looks somewhat out of place.



The Grenadier's robust five-link front and rear suspension is tuned to deliver great levels of axle articulation and wheel travel. Its Eibach progressive rate coil springs offer flex, with 9° of front-axle articulation and 12° at the rear – enabling more than 585mm of travel to maintain grip and make light work of driving over extreme uneven ground.

► in 8.6 seconds, with the diesel only marginally slower off the mark. Both engines are tuned so that the power and torque are at the lower revs necessary for towing and off-road, hence the surprising pick up.

The Grenadier is making me feel quite at home on the road given it was built as a no-compromise off-roader. However, one of the things I was intrigued to test for myself was the steering. It's been reviewed by others as being too slow, vague, and with a turning circle that's too large. That wasn't my experience when making an easy three-point turn in a field gateway and I don't need the reversing camera to know how far I am from the gate.

A mini-roundabout gives me the opportunity to test the steering lock, a quick lap on full lock and I'm not really sure what all the fuss is about. Yes, you have to straighten up by turning the wheel yourself, but I didn't find it a problem. In fact I didn't really notice, but it was a characteristic that was raising some discussion among the motoring journalists after the drive. One of them mentioned that he found the steering a bit indifferent; he felt that he didn't get much feedback on a straight road and had to keep making micro-adjustments. He also didn't like the way the steering wheel didn't self-centre after a tight turn and the fact you have to manually straighten it up. It's probably a criticism that will keep on being levelled at the Grenadier but if you've driven a lorry or a tractor then it's not something that will bother you.

## Ball bearing system

As you'd expect with the Grenadier, there's a reason behind the feel of the steering. It uses a recirculating ball bearing system which is very clever and very strong. Importantly, when off-road and thumping into a pothole or a rock, it stops the steering wheel ripping around and dislocating your thumbs.

My second drive of the day is a dark green Trialmaster, the more workmanlike Grenadier model kitted out for proper off-roading. It has cloth seats, front and rear differential locks and grippier BF Goodrich All-Terrain T/A KO2 tyres. Central diff lock is standard on all models.

Nothing too challenging to start as we set off out of the estate and into the forest. The gravelly track is fairly flat with a few potholes — not dissimilar to many farm drives in this part of the world. We're still in high box, however you start to get a feel of the steering, power delivery and throttle control.

Deeper into the forest, conditions become a little more exciting, so we drop into low box (it has a 2.5:1 ratio) and select the central diff lock. To do this means coming to a stop — you can select the central diff while moving but need to be in neutral to shift between low and high ratio. Like many features of the Grenadier, the process is manual. Lift the collar on the small gear stick and a good pull back and it locks into place. To lock the diff, it's the same process but push to the left. It feels solid and robust.

Off we go again, this is more like it, steeper, rougher, a bit muddier. The Grenadier is growing on me — you can place the wheels where you want, and

power delivery is very controllable. The suspension is making it quite uneventful, so I purposely drive over a decent-sized stone. The progressive springs soak it up, you hardly feel it.

I ask pro-driver Lisa when you would use the rear or front lockers, and she tells me only if it's so undulating that a wheel is likely to come off the ground. We're making easy progress when a message comes through on Lisa's two-way radio. I can just about make it out, 'stop at the bottom, we are about to come down Everest'. We duly stop and wait for the other car, which eventually comes into view to our left — at least, some of it does... The slope rises sharply to our left and I can just see the roof of the Grenadier and it's coming straight down at quite an angle. Interesting...

The other car passes, and off we go. As we turn the corner 'Everest' comes into view. It's a track in a gully going straight up the slope, it's steep, rocky, and gnarly — especially in the middle. The first section is no bother, but the middle section is steep, about 40 degrees, with a sump-busting rock right in the centre of the track and a big rut on the left. Maybe the Grenadier would clear it, I don't know, but I am not chancing it as I think of all the disclaimers I had to sign. There is a bit of rock sticking out of the left-hand bank, so I aim the nearside wheels at it. Over we go and clear the sump buster — too easy, the wheels never lose grip, the power is smooth and steady, and it's easy to place the left-hand front exactly where I want it in spite of the steep and slippery conditions. We get to the top, that should have been difficult, but it wasn't.

On a very muddy, but flat, grass track, I disengage the central diff to see how it copes. One tiny loss of traction which is impressive, it should have been slip-sliding away as after the rain the conditions are pretty greasy. Back to Everest and we prepare for the decent, central diff locked again and this time Lisa suggests we use

## Off-road capabilities

### Ineos Grenadier – Station wagon models

Ground clearance	264mm
Ramp breakover angle	28.2°
Departure angle	36.1°
Gradeability	45°
Wading depth	800mm
Front-axle articulation	9°
Rear-axle articulation	12°

the downhill assist button and I'm not arguing. The button controls the power and braking so you only have to steer, rolling down gently at 3mph.

## Engine braking

Reaching the lower, less steep part of the hill, I want to test out descending using engine braking, and a quick push of a button to deactivate the electronic downhill assist and it's an old school descent in first gear. We roll gently down under engine braking, with good control.

Back at Glenusk house, the journalist who hadn't liked the steering on the road was waxing lyrical about it, he had seen the light. The Grenadier is built to be an extremely good off-roader not a road car, although it does a pretty reasonable job at that too.

Final thoughts — the Grenadier is a car that makes you smile, perhaps because you're not just a passenger while it makes all the decisions for you. That's why when the Grenadiers is inevitably compared to the luxury SUVs such as the Land Rover Defender and others in that class, in part because the Ineos journey began with the demise of the old Defender, it isn't really the right comparison.



*Under conditions where one wheel is completely off the ground, engaging the front and/or rear lockers will get you out of trouble.*

Jumping in and driving the Grenadier felt like pulling on an old pair of wellies, it was familiar and easy to get on with. It reminded me of the old Landies, and the early 1990s Landcruisers — utilitarian vehicles that are most at home in the testing conditions you find off-road. It's a modern-day improved version of those cars, using old technology that has been well engineered.

That really sums up the Grenadier — it's well-made, it's tough, and will reliably get you out of trouble, but is also comfortable and easy to drive. It's a vehicle I can imagine growing old with rather than trading in before it becomes too expensive to keep.

The brief for the Grenadier was to build an uncompromising, capable off-roader. I would say Ineos has nailed it. ■

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# Further blight complications

BP2023

Once every two years, anyone with a serious interest in the potato industry heads to the Yorkshire Event Centre for a specialist trade show. CPM attended BP2023 in Harrogate for insight into the latest sector developments, including what's happening with EU\_43\_A1.

By Janine Adamson

Attendance at industry trade shows can often be up and down, depending on whether field operations have to take priority and how pressured the day-job is. But with the continued threat of a Danish blight strain, BP2023 in Harrogate proved a lively platform for discussion.

Experts first highlighted the problem of EU\_43\_A1 in January 2023, with stewardship advice promptly issued from Syngenta due to the strain's resistance to the carboxylic acid amide (CAA) group of fungicides, including mandipropamid (found in Revus).

The advice included always mixing CAA fungicides with a partner product, alternating sprays with different modes of action, and to limit the number of CAA fungicides within the blight programme (as

recommended by FRAC guidelines).

Then in June it was announced that the Fight Against Blight (FAB) service which monitors genotypes and shifts in fungicide sensitivity was to continue after securing industry sponsorship.

## No population change

FAB project leader Dr David Cooke from the James Hutton Institute presented this year's results live at BP2023. He says there have been no significant population changes in GB during 2023, with 36\_A2 (51%) and 6\_A1 (34%) still dominating the 830 genotypes isolated from 1,500 samples sent to FAB. As for EU\_43\_A1, according to the screening, it remains elusive.

Furthermore, sensitivity testing of the main GB genotypes against key fungicide actives (ametoctradin, amisulbrom, oxathiapiprolin, propamocarb and zoxamide) found no efficacy concerns this year.

However, Corteva Agriscience recently confirmed EU\_43\_A1 resistance to oxathiapiprolin (OXTIP) in some parts of northern continental Europe – as found in products such as Zorvec Enicade. And confirmation of a single finding of the strain in a sample taken at Teagasc's research station at Carlow, Ireland, further fuels concern, says the firm.

Harper Adams University's Dr Matthew Back says although the EU\_43\_A1 genotype hasn't been recorded in the UK, there's always risk from incursions via airborne sporangia. "These can travel distances over 40km and have been

“The introduction of new, non-clashing chemistry is essential.”

detected at 1km from the ground.


“If detected, it's important that the principles of integrated disease management are applied — paying ▶




Corteva recently confirmed EU\_43\_A1 resistance to oxathiapiprolin in some parts of northern continental Europe.

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David Cooke says the 36\_A2 and 6\_A1 strains of blight still dominate within GB but EU\_43\_A1 remains undetected.

► attention to sources of *Phytophthora infestans* such as dumps/cull piles and groundkeepers. It sounds simple, but these sources aren't always under the best management," explains Matthew.

James Cheesman, technical manager at Certis Belchim (sponsors of FAB), says that similar to advice from earlier in the year, growers must use all modes of action available when constructing balanced programmes. He stresses that fungicide groups should be mixed and alternated as much as possible, and incorporating multisite inhibitor mancozeb will also be important.

So on reflection, it could be argued that BASF launching a new late blight fungicide

at BP2023 was timed to perfection.

Matthew Goodson, BASF specialties market manager, says the two active ingredients found in Privest (ametoctradin+ potassium phosphonates) offer a synergistic effect when it comes to controlling the disease. "The aim is to build resistance early in the programme by working with the plant," he explains.

Ametoctradin is classified under the QoSI chemistry group, which Matthew Goodson says sets it apart from all other actives including traditional CAA and Qil chemistry options, meaning Privest is in a 'league of its own'. This is combined with potassium phosphonates to boost the plant's natural defences. ►

## DeCyst developments

The latest results from the ongoing Defra/Innovate UK-funded DeCyst project were unveiled at BP2023.

The project focuses on factors that affect the performance of three solanaceous trap crops used for potato cyst nematode control — *Solanum sycmbriifolium* (DeCyst-Prickly), *Solanum scabrum* (DeCyst-Broadleaf) and *Solanum chenopodioides* (DeCyst-Podium).

Grown optimally, DeCyst-Prickly can reduce PCN populations by more than 75%, but inconsistent establishment has impacted adoption on-farm.

So far, results have been mixed due to seasonal extremes within the trial period, although this has presented an opportunity to understand the sensitivities of DeCyst products, says Produce Solution's Dr Bill Watts.

"We're pretty confident in the main variables to consider when planting DeCyst trap crops — moisture in the top layers of the soil at drilling and



Grown optimally, DeCyst-Prickly can reduce PCN populations by more than 75%, but inconsistent establishment has impacted adoption on-farm.

early establishment, seedbed consolidation for moisture retention and seed-to-soil contact, and consistency and control of drilling depth in the top 10mm of the soil.

"This means that drilling method is actually pretty flexible, as long as the soil conditions are correct," he says.

The project has also identified the importance of weed control due to solanaceous trap crops being highly susceptible to competition during early establishment.

"Once up and away, DeCyst products are very competitive, however limiting weed competition in the first few weeks after drilling is vital. We've investigated several herbicides and combinations and have subsequently identified a suitable active.

"Because there isn't an authorisation for this specific application, we're working with the manufacturer to apply for an Extension of Authorisation for Minor Use (EAMU)," says Bill.

In terms of the best DeCyst products for use in commercial farming systems, Produce Solution's James Lee says the answer could lie in blends.

"This is something that became apparent at our grower demonstration sites.

"Mixing DeCyst products together could increase the likelihood of a good stand and therefore greater opportunity for PCN control. Where one species may be challenged by seasonal conditions, another should succeed, in our experience."

Some might argue that funded research of this type fails to address real-life on-farm problems, however James says this hasn't been his experience. "Outreach has been an integral part of the project work — we've conducted two knowledge exchange events at our trial sites this year, a range of grower site visits and hosted retailers.

"Interest in trap crops continues to grow among



Results have been mixed due to seasonal extremes during the trial, although this has presented an opportunity to understand the sensitivities of DeCyst products, says Dr Bill Watts.

growers and agronomists. As an industry, we must do all we can to support the continued approval of fosthiazate, however if we lose it, we still retain a number of IPM tools which will have to be used in a co-ordinated approach, throughout the farm rotation.

"The remaining nematicides will play an important role in this and, while breeding has focused on PCN resistance and tolerance for a number of years, we still only have a handful of truly sustainable varieties," stresses James.

"Our most recent trials have built on the work of 2022 and are showing the route forward quite clearly — we now have much improved agronomy guidelines which I'm confident hold the blueprint to success," he concludes.

The DeCyst project is a collaboration between Produce Solutions, Crop Health and Protection (CHAP), Harper Adams University and VCS Potatoes, supported by four potato growers — TC & N Taylor Ltd, J.M. Bubb & Son, ME Furniss & Sons (Farms) and James Foskett Farms Ltd.

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According to Luke Pollard, tuber treatment *Honesty* not only gives comprehensive disease control, it also brings physiological benefits to the crop.

▶ “Privest introduces much-required variety to blight control programmes which is essential both for mitigating the risk of resistance development and efficacy,” adds Matthew Goodson. “We believe it gives the best start to a blight programme by going in early and strong, freeing up the ability to use other products later in the season.”

Specialities business development manager, Paul Goddard, agrees that EU\_43\_A1 and the associated limitations to CAA chemistry serve as a stark reminder of how swiftly disease evolution can impact crop protection. “That’s why the introduction of new non-clashing chemistry, like Privest, is so essential.”

Also under the spotlight was liquid tuber treatment, *Honesty* (fluxapyroxad). The SDHI fungicide targets a range of diseases including rhizoctonia, silver scurf and black dot, as well as having incidental activity

against dry rot and gangrene.

A rather eye-catching shade of bright blue, *Honesty* is approved for use on all potato crops whether that’s seed for seed, for ware or for processing. BASF’s Luke Pollard says the blue hue gives growers reassurance of consistent coverage, but the real magic is in the product itself.

“We’re really excited about *Honesty* because not only does it give comprehensive disease control, it also brings physiological benefits to the crop giving more even stolon initiation which results in more marketable grade out.”

### Electric weeding

For something completely different, BP2023 attendees had the opportunity to learn about Nucrop — a hybrid herbicide concept that combines a conductive liquid called Volt fuel with electro-physical weeding. The all-in-one-pass solution is being developed by Nufarm and German ag-tech start-up, Crop.Zone.

In terms of potatoes, it’s hoped Nucrop could be the answer to the ongoing desiccation conundrum following the revocation of diquat in 2019, providing an alternative to chemical control or flailing.

Nufarm’s marketing manager Louise Dalglish says the concept works by pre-treating plants with the conductive liquid and then applying an electrical charge to desiccate. As a result, the operation is achieved with a high degree of efficiency but lower energy consumption than conventional weeding technologies.

And compared with conventional desiccation techniques, one Nucrop application is equivalent to two chemical passes, explains Louise. Nucrop is initially



An update on the DeCyst project was provided as part of BP2023’s seminar programme (for further information, see box on page 70).

focussing on potato desiccation, but the plan is to expand applications to include wider weed control.

Over in the seminar hall, topics included the latest agri-tech case studies, tackling storage challenges, and British potato market trends. Echoing the message from the main exhibition hall, ADAS’s Dr Faye Ritchie presented the findings of a three-year project led by a consortium of industry players including ADAS.

The field experiment aimed to provide evidence to determine and rank the effectiveness of fungicide resistance management strategies, which include blocking, alternation, and with and without a solo/multisite fungicide. The trial was based around the presence of EU\_37\_A2 and fluazinam use.

Summarising the results, Faye says the trial showed repeated and sequential application of a single site mode of action increases selection for fungicide insensitivity. Equally, mixture partners and alternation are two of the most effective resistance management tools for late blight.

However, Faye stresses the role of non-chemical control methods such as choosing cultivars with resistance, improving out-grade pile management and effectively controlling volunteers. She believes these can often be over-looked yet remain valuable. ■



BP2023 remains a popular show among growers and industry experts alike.

## Biostimulant field trials

A series of trials have indicated the potential of using a brown seaweed-based biostimulant to improve the marketability of potato crops. Revealed at BP2023, the results show that three 1.0 l/ha applications of Algifol produced a 29.6% increase in tuber numbers when applied to a crop of Melody. In particular, there were 27.3% more tubers at 40-64mm — the ‘sweet spot’ for packing potatoes.

Another trial on a crop of Accord increased the uniformity of the crop, and boosted weight by 18%, when compared with the standard farm practice.

Finally, a third trial was conducted on Accord and Lady Rosetta at a farm near Hull. Across the two field trials, Algifol increased

tuber numbers by 13 and 7%, again compared with the farm standard.

The product is distributed in the UK by MJP Supplies. Director Marcus Palmer says the trials were conducted in challenging growing conditions, making the results even more stand-out.

In terms of grower feedback, Driffield farmer Andrew Meginson says he’s experienced good results from using the biostimulant. “The canopy stayed green throughout the season despite challenging weather, which I’m sure caused stress to the crops not treated with Algifol. Yield was up and we were pleased with the size uniformity and overall quality of the crop when it was lifted,” he says.



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# talkingtaties

by Andrew Wilson

**It will dry up, it always does... eventually!**

**The answer to the question no doubt uppermost in most taty growers' minds is 2.6% (or four acres). That's what we have left to lift.**

There are two varieties in three wet bits and as things stand, that's where they will be staying for a good while yet. It's frustrating, but we've been here before. It'll dry up, it always does... eventually.

My optimism for decent yields last month wasn't entirely unfounded, and all varieties performed reasonably well. Lifting was more challenging to say the least, and very stop-start. We were quite shorthanded this year, for various reasons, but the team stepped up and we got through it.

Storage is another matter and we have moved a chunk of March-contracted crop already. We put it in the front of the store because I knew its storability was questionable. Some we washed, some we didn't, but all eight loads went into the factory without any bother.

I appreciate the flexibility to do this because the fortunes from potatoes in recent years haven't put much fat on our back to carry big losses and it's in no one's interest for the crop to run out of the shed. Open, proactive and constructive dialogue with customers is never more important than in times like these.

I believe that where at all possible, 'give a bit to get a bit' is the right way forward, and my November-contracted tonnage will now stay another month or two, which suits both of us. My few November-contracted crispers have moved bang on time too, which is pleasing.

Now the troubled tonnage has moved, and a few cooler nights have allowed us to pull down the storage temperature to the right side of double figures, at least, we have once again treated the rest of that particular store with DMN. The jury is still out on which product to choose for the January/February store, which presently shows no sign of dormancy break at all. Life was much simpler in the days of CIPC.

So, lessons from the season? My approach for most things is 'as little as possible, but as much as necessary'. This is particularly true when it comes to cultivation, where once again the less intensively cultivated fields have taken the weather better. Cover crops here contribute significantly to both reducing the need for bed tilling and improving soil health, but some weren't very good last year.

The spade is still ever essential, and we 'over egged

the pudding' in one trial by reducing depth too much without sufficient attention paid to compaction. As a result, that area is still to harvest. Last year, we converted an old shakaerator to low disturbance legs, and where that was used percolation wasn't a problem — pretty much to the line. It's only an acre, but lesson learned.

Our row dammer appears to be worth its salt, with noticeably less erosion and water standing in the low spots in two particular fields where this has been a problem in the past. This has made the difference between those fields being able to be harvested or not and resulted in a better quality crop to boot. It's not the most comfortable job to do, so I think a new set of cab mounts and a better seat is called for on the old Nash that we use for the job.

We use a tiny fraction of the nematicides that we used to 10 years ago, and soil health checks seem to confirm that beneficial soil life is more intact as a result. The presence and health of worms is always a good guide, along with the texture and smell of the soil. I'm no academic, so I tend to experiment on a small scale with alternative ideas rather than seek scientific papers on a subject. This might only be a couple of untreated beds, or a few short beds of an alternative approach, but as a general rule, if it works consistently and doesn't cost the earth, we keep doing it.

It would be remiss of me not to mention the headache of the moment that is sugar beet. We're yet to lift any because of the terrible weather, and in a nutshell,

*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**

I will not be signing any contracts until the proper agreed negotiation process is complete. For British Sugar to think we as growers would roll over and accept an extra 50 pence, and ignore the many small-printed caveats is, in my view, optimism epitomised. The working time directive and UK weather are not exactly compatible for a start.

The less said about cereal drilling here the better. Some heavy land that's not planted at present has actually saved money due to the waterlogging that would have rotted seed off. There will be some field swapping and cropping tweaks to be done in the coming weeks, of that I am sure.

By the time you read this, the great industry showcase that is BP2023 will have been and gone. I'm quite looking forward to it. Next on the list is the GB Potatoes inaugural AGM, then CUPGRA, so I'll maybe see some of you at those.

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# last word

by John Swire

## Random thoughts from the editor

**The UK sugar industry was blown apart last month, with accusation and counter accusation after British Sugar contacted all growers with a document containing details of the 2024/25 sugar beet contract offer. This was done, apparently, without agreement or even consultation with the NFU, as is the normal procedure.**

The NFU has responded by accusing British Sugar of circumventing the negotiating table and offering its growers a contract considerably less than they had hoped to agree. The NFU has also claimed that some growers have been told by British Sugar account managers that the difference between British Sugar's offer and the NFU's position is only £2/tonne. What's more, if they signed up early, they would have access to better-yielding seed which would more than make up the difference. This is contrary to the claim by the NFU, who has said that it was looking at a considerably higher contract figure as the global sugar price is forecast to rise significantly in 2024. The seed information pack was also said to claim the NFU approved of the package and that it differed substantially from the NFU

proposal under negotiation.

So, in essence British Sugar was not only imposing a minimal price rise on growers but was suggesting that the price rise would only be available if they purchased their seed from British Sugar itself. Quite naturally, the NFU reaction was predictable and it advised growers not to agree to the offer.

At the time of writing, British Sugar has announced it is temporarily pausing its contract offer and seed ordering for the 2024/25 season "in order to help facilitate negotiations with the NFU and endeavour to agree prices and terms for next year's contract." They also announced that negotiations will recommence this week with the intention of agreeing a contract for next year as soon as possible. A case of brinkmanship at its very best!

There has always been a certain amount of tension between the NFU and British Sugar, but eventually things have usually worked out in some sort of compromise between the two bodies. The

fact that British Sugar has not been broken up, or at least had its ability to run what is essentially a monopoly taken away, has always been puzzling. Perhaps now is the time to reconsider how sugar is manufactured and marketed thus allowing growers to be adequately rewarded for their labours.

Meanwhile, over at Red Tractor there has been further disquiet between the organisation and farmers due to the recently announced Greener Farms Commitment, a voluntary environmental module due to be launched in April next year. The frustration many farmers felt was that the module would not remain voluntary and would put extra costs onto the producer, who in turn would not receive anything in return for their investment. Also, there was concern from the NFU that the Red Tractor Board had bypassed discussions with technical committees and NFU sector boards.

As a result of all this confusion, the NFU called for

two critical reviews looking into whether Red Tractor provides value for producers. The first review will look into Red Tractor governance and the second will take a look at revolutionizing 'farm to fork assurance.' As a result of the action taken by the NFU, Red Tractor has promised not to progress with the implementation of any new standards or additional modules until the first NFU review.

Yet again, as with the confusion over sugar beet contracts, all it needs is for the relevant parties to get together and sit round a table. Red Tractor comes from a good place, but there is a consensus that retailers are getting the benefit of Improved standards while producers are carrying the costs of meeting them.

The NFU, Red Tractor, and the retailers must sit down and work through a process that is agreeable to all. Contrary to popular opinion, we are all in this together and need to remain so.





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