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and unlocking
its potential
Page 8**



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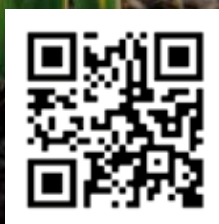
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**Volume 26 Number 8
August 2024**



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Editor's Pick

In the words of the Foo Fighters – 'I've got another confession to make'. In last month's CPM I had a momentary lapse of lucidity and ran the incorrect Talking Taties column. Some might ask, why bother highlighting the fact now? Well, when Andrew has gone to the trouble of writing it I should honour my promise of ensuring it's printed.

Sadly I can't undo this faux pas in a physical sense, but what I can do is point readers to the rectified version which is on our website, and of course, encourage the reading of his latest musings on page 86. As a perfectionist, making such errors weighs rather heavy so making 'good' of a situation like this helps me to move forward.

Thank you, Andrew, for being understanding and forgiving my human-ness! And thank you to all of our columnists for their contributions and input.

Oopsie aside, hopefully this issue's cover image incites a smile or two. It's a significant departure from our recent run of covers and is what I believe the marketers among our trade would call slightly 'disruptive'. Having had a good eight months or so in the job, I guess I felt it was time to try something different.

Unlike business-to-consumer publications, CPM doesn't have to grab attention on the newsstand to provoke a purchase, but that's not to say we can afford to be complacent. The magazine has to live by its values and present itself accordingly – we remain worth reading.

I'm actually anti heart shapes in terms of home decor (don't get me started on 'live, laugh love') so there is some irony involved here. But the point is, a strong cover for a strong article by Melanie and I hope you enjoy learning from Odette Ménard (page 8).

A favourite of mine will always be our survey summary articles, and in the case of this

issue, the topic is weed control (page 25). Charlotte dives into the data to share findings from the 400+ participants who took part – a fantastic sample size.

We continue in the same vein on page 28 where we look at weed seed return and the role of crop competition including new trial findings. This article also features a box-out on seed predation research being conducted by PhD student Jasper Kanomanyanga. I think it's incredibly important to highlight the work of our next generation of experts, after all, our future lies in their hands.

As you may have guessed, I'm a fan of learning something new so when given the opportunity to report on the winter linseed trials which have been taking place in Scotland, I jumped at the chance (page 48). Not only have they become a huge success, but they're delivering some of the best trial yields across Europe.

Something I'd been pondering for a while is whether anyone in our trade is biostimulating cover crops yet, and following a little digging, it seems they are. You can read that feature on page 50.

As we've previously discussed, it can be difficult to make the Machinery section of the magazine 'pop', but one way is to include user case studies and explore their wider farming systems. Melanie does just that when she interviews Ben Pelpoe on page 80, to see how he's getting on with his Horizon DSX 60-25 drill.

To round off in Roots, Mike Abram explores how an endophytic grass could help growers to control two key sugar beet pests (page 87). Again, it's great to challenge the brain and gain insight into tomorrow's solutions.

Speak soon,

Janine



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smith's soapbox

by Guy Smith



St. Margarets field under new holy orders

Harvest 2024 is erased from the fields but probably not from the memory, for all the wrong reasons. The record wet that fell in both the autumn and winter left its scars – cereals don't like standing in waterlogged soils for month after month particularly on our heavy

unstructured marshlands.

Even out of the wet holes the crops didn't seem to yield. On top of that, rust in the Crusoe and blackgrass everywhere else proved further body blows leaving yields on the floor. And just to complete the litany of woe, I've never seen so much pigeon damage in the wheat. From early July the blue army seemed to make camp around the patches made bare by standing winter water and work out from there with enough devastating sorties to make Napoleon proud. All in all, even my pub yields were nothing to shout about.

Hopefully all of this misery has cheered some of 'schadenfreuden' you up.

During a bad harvest it's always nice to hear about other people's disasters rather than their barn busting triumphs. Meanwhile, I'll take heed from Kipling who counselled in his poem 'If' – that I should treat triumph and disaster just the same.

On the bright side, it was an easy sunny dry harvest with no need to get out the giant, gas-fired drying pot. Quality was also okay with good proteins – which was the silver lining of the cloud that is low yields.

I'm minded to mention the 'e' word, but the first rule of the ergot club is to not mention the ergot club. Nor is it a good time to remember Albert Hoffman – the Swiss chemist who in the 1930s synthesised artificial LSD by copying the chemical compounds found in natural ergot. It's enough to put a whole new meaning on the phrase 'taking a trip to the bakers'.

So Harvest 2025 beckons as we lay down its foundations this coming autumn. But in the new world of SFI payments there'll be quite a few hectares on this farm where the annual cropping cycle will be broken, for the first time in living memory.

One of this year's better yielding fields is called St. Margarets. I'm not sure why it's called that, but you'd guess it's something to do with a monastery or church. Either way, St. Margarets field has a special place in my heart in that it's the first field in which I was allowed to drive a combine as an 18-year-old.

I can remember my dad's withering judgement on my first in field performance – 'you drive about as straight as a dog piddles in the snow'. Despite my early wayward struggles when it came to keeping the combine header full, I've continued to drive the combine



Harvest is cleared from St. Margarets field. Next year it'll be in NUM3 – the first time the field won't be cropped in living memory.

on St. Margarets field every year for several decades.

But next year I won't be, because it's going into NUM3. It's an end to an era of continuous cropping that probably goes back centuries. I'm sure the break will do it some good but I'm not so sure as to from where the UK will replace the hundreds of tonnes of milling wheat, oilseeds and protein that St. Margarets field produced on a regular basis.

It's worth noting our new farming minister is now titled 'Minister for Food Security'. I wonder if he'll be interested in what's happening on St. Margarets field?

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.

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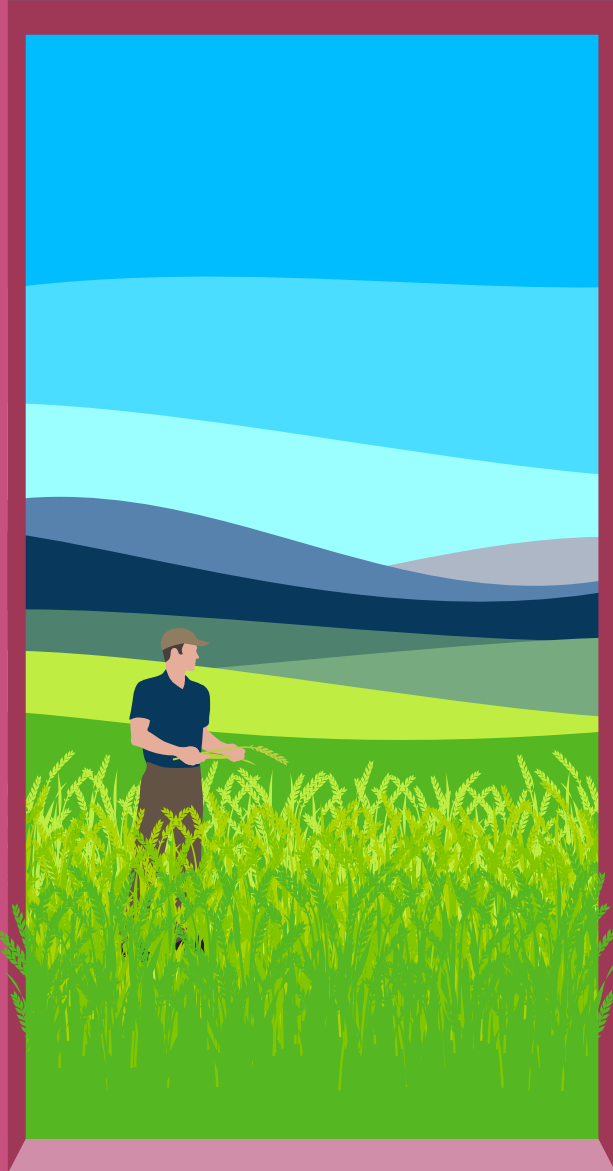
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“ We spend hundreds of hours a year on machines and I wish we’d spend as much time soil profiling.”

Soils

Dig a bit deeper

Soils are the life support system of the crops farmers produce, but to unlock their potential they require cover, roots, oxygen and porosity all working in unison. CPM digs into the matter.
By Melanie Jenkins

The emphasis placed on improving soil health has become integrated with many aspects of modern agriculture, but as Canadian agricultural engineer Odette Ménard pointed out at Groundswell in July, there’s so much more that can be done to achieve truly healthy soils.

Regen agriculture has appeared in many guises for Odette. “Around 30 years ago we were talking about soil conservation, then it became sustainable agriculture, followed by agro-ecology, eco-agronomy and now we call it regen agriculture. But for me, it’s always been soil health.”

Before the prevalence of agriculture, forests created an equilibrium in soils through the diversity of roots not just from the various types of plant, but the range in the size of their roots, she explains. “But with the introduction of farmed perennials and then annuals, it’s decreased the

level of organic matter in the soil. “We now focus on the organic matter in the top 15cm which is turning over every 5-10 years, but it’s the really high-quality organic matter in the soil below this that’s been depleting at a much slower rate and could take 100 years to cycle. So even though we’re moving towards healthier practices we could still be losing organic matter from this lower layer.”

Odette points out that a lot of effort goes into managing the top 15-20cm (6-8inches) of soil, which she calls the direct intervention zone. “This is where we’re ploughing, discing, disturbing the soil, planting and harvesting. But all of this work we’re doing, despite our intentions to do good, causes collateral damage in the form of compaction, soil surface pulverisation and erosion.”

Soil profile

When it comes to assessing soil health, although it’s easy to visually analyse a field above ground and determine if what’s growing looks to be a good crop, she points out that when digging deeper, it can become apparent that the soil profile isn’t always allowing roots to grow to their full potential. “This is the very first step we should be taking and you should soil profile in good and bad parts of the field and when there are active roots in the system.

“The real soil potential is what’s happening up to 76-102cm (30-40inches) deep and we want there to still be

root activity here. Something we don’t do enough is pull our shovels out to dig at least 90cm deep into the soil profile to find out what’s going on.

“And once you’ve dug into the ground you can determine horizons to work on based on colour, structure and root system. But it’s not just about the aesthetic of the soil, it’s also about the smell and whether this is bad or not. Another test is to run a knife through the soil to determine where there’s resistance and therefore compaction that will require actioning.”



Agricultural engineer, Odette Ménard points out that a lot of effort goes into managing the top 15-20cm (6-8inches) of soil, which she calls the direct intervention zone.

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▶ Although more costly forms of management, such as subsoiling, drainage and levelling can be utilised to assist soil health, she flags that this still won't reach the entire soil profile. This is where her 'CROP concept' comes into play. According to Odette, this consists of four main principles which have to work together for soils to thrive and be healthy: these are cover, roots, oxygen and porosity.

"We often look at these elements separately but they each have an impact on one another. Cover will lead to less crusting, better germination and more sun protection, which leads to more root growth. The root system impacts the cover itself and the porosity by supporting more microbial life, creating deeper explorations and further glomalin production. If there's high porosity in the soil there'll be a better root system because there's more space and greater access to nutrients and water. And the better this system is, the less compaction there's likely to be.

"No-till was meant to be the answer, but it didn't work because we didn't have porosity in the soil, so we have to work all of this together in order to have a truly healthy soil that won't see yield losses. If one element is missing, we put a lot of energy into changing a system that still won't work."

Cover crops provide both a way of alleviating the issues caused by compaction and improving the root system and soil porosity, she says. "Although we can take all of these steps, we won't be able to go back to the levels of organic matter found in the original forest systems. In addition to this, the climate is going to have an influence



When digging deeper, it can become apparent that the soil profile isn't always allowing roots to grow to their full potential.

on replenishing organic matter."

Odette flags that organic matter is built by residue but that only 8% of the carbon in residues will end up in soil organic matter in no-till systems. "But with cover crops and organic manures this is 12-23%, and from the root system, 45% of the carbon will become organic matter, so it's important to get more roots into our systems to feed it."

Before any steps are taken, Odette again stresses the importance of digging into the soil profile to find out what the issues are. "We spend hundreds of hours a year on machines and I wish we'd spend as much time soil profiling. If we're soil profiling and we see a compacted layer at a certain depth, then it's possible to

determine that subsoiling should be done 10cm below this – if we subsoil above or too far below the area of compaction then we aren't tackling the issue, but without soil profiling we wouldn't know."

However, subsoiling also has to be done when soil is at the right humidity at the depth that's going to be worked, she says. "Ahead of subsoiling, you should plant cover crops a week to 10 days before to allow the roots to work into the cracks produced through subsoiling – and then don't go back into your field for at least a month. But it's important to note that subsoiling is like chemotherapy, in that it's a practice you only ever want to have to do once – you don't want it to have to be a repeat solution." ■ ▶

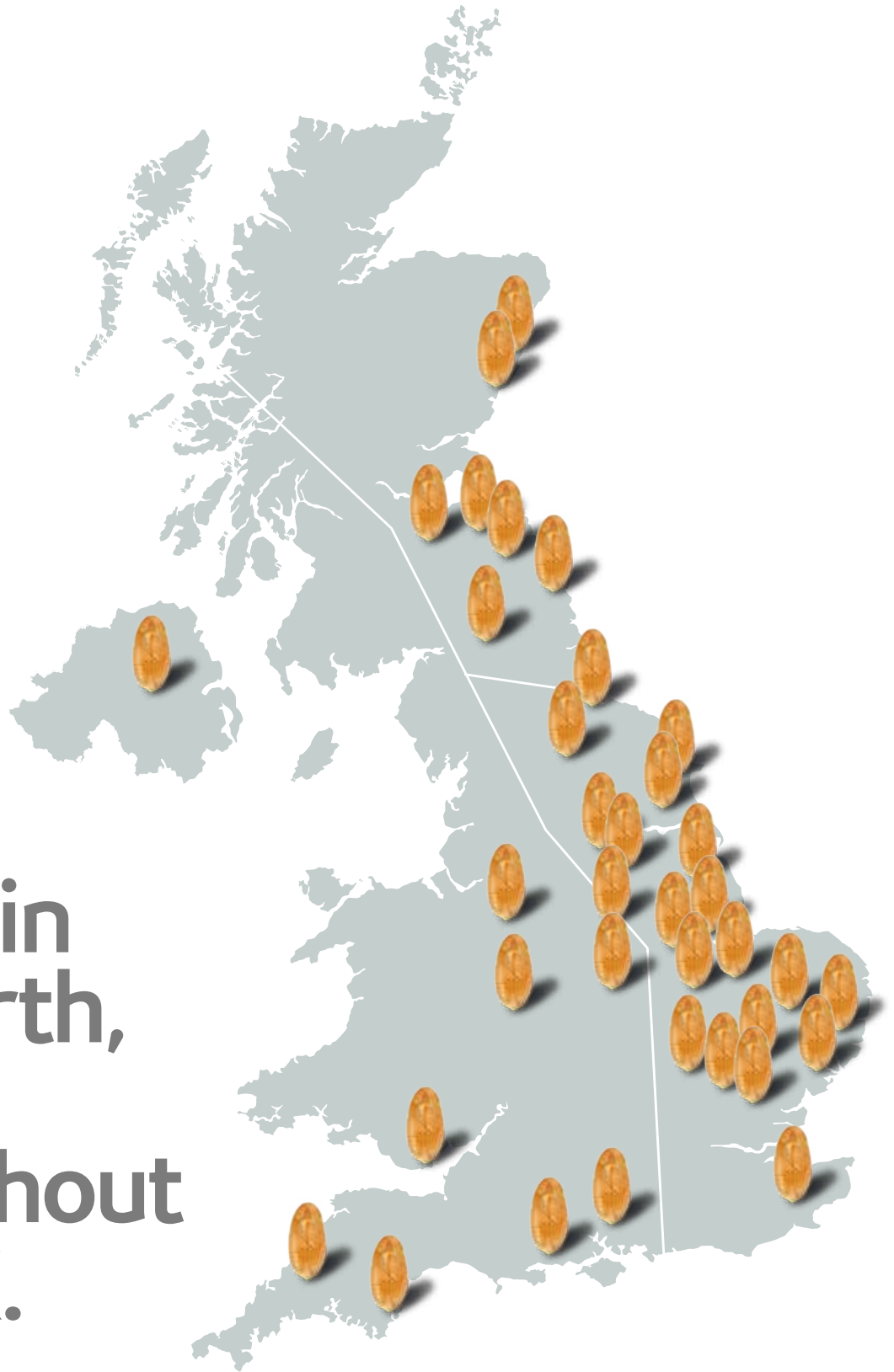


Organic matter is built by residue but only 8% of the carbon in residues will end up in soil organic matter in no-till systems.



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According to Odette, soil compaction throws into relief what type of impact farming has had on the soil. The diffusion of nutrients is severely impacted by the level of compaction, she says. “NO₂ (nitrogen dioxide) can diffuse at a rate of 0.9-2.99mm per day, depending on how compacted a soil is. This ranges from 0.009-0.29mm per day with H₂PO₄ (dihydrogen phosphate) and 0.29-0.9mm per day with potassium. If we want a better diffusion rate in our soils, we should be avoiding compaction.”

Compaction also impacts the main root system, the absorption hairs and the mycorrhiza, she explains. “We have to look at minimising compaction to help maximise root growth as their ability to grow all depends on the health of your soil.”

She also points out that compacted soils can potentially only have an infiltration rate of 0.05m per day, whereas in healthy, well-structured soils this is as much as 1m per day. “This'll have a big impact on the water management of soil. In very healthy soils the water holding capacity is far greater, but when soil is compacted water has nowhere to go and this is where we get run-off.

“It's also important to understand that porosity has to have continuity and this leads to capillarity – in poor soils there's



The first, and arguably the most significant elements causing compaction, are tractors and machinery.

very little space for water to actually get to your plants. The impacts of this are multiple, ranging from a smaller zone of root

growth to poor aeration and infiltration, to lower yields and high production costs.”

The first, and arguably the most significant

element causing compaction, is the tractor, she highlights. "Soils can have surface and sub-surface compaction with the former being affected by the air pressure in tyres."

When air pressure is lower the effect at the soil surface is reduced, she says. "This is because the tyre sinks less due to its larger surface area, and because less soil is compressed, this reduces the slope of soil the tyre pushes against – something we can't see by eye – resulting in more economical fuel consumption, cutting usage by about 15%. Further to this, lower air pressure will allow the soil surface to retain more of its porosity."

The difference between a tyre set at pressures ideally suited for road travel and for movement across soil are significant, says Odette. "For example, an identical tyre at 23psi will have a contact area 37.5% larger than if the pressure was set at 9psi," she explains. "Tyre pressure is often set for road conditions and therefore at the higher level, but tractors are more often than not spending the majority of their time working in fields and not traveling on roads."

To indicate how much pressure further impacts the surface, she points out that tyres set at 17psi will exert 24psi onto the soil surface, but if tyres are filled to 6psi, this will exert 13psi. "At 17psi we're seeing way too much pressure applied on the soil surface which will cause compaction."

So why is it so important to prevent soil surface compaction? "When compaction occurs at the surface, it pulverises the soil structure and we've seen instances of up to 95% fewer roots in the surface compaction layer. This is significant when you consider that a plant can have up to

80-90% of its total root system in the first 30cm of soil."

However, about 5% of a plant's roots can be found up to 1m deep and according to Odette, and these roots can provide up to 20% of the water a plant requires, making it incredibly important.

A few simple steps can be taken to help prevent compaction and protect soil porosity, the first of which is to aim for a maximum of 12.5psi in tyres, she stresses. "We have to lower the pressure to protect the soil surface and this is highly achievable."

But to avoid sub-soil compaction, further steps are necessary, adds Odette. "It's also vital to avoid exceeding 3.5t in weight per wheel – not per axle, per wheel – and so it might be worth looking to add another set of wheels because halving the weight per wheel will have a greatly reduced impact on compaction."

Other steps that can help to avoid compaction include optimising the balance of the tractor, slowing down and working in optimal conditions. And conditions can play a large part in the impact machinery has on the bulk density of soils, says Odette.

"It's generally understood that working in dry conditions will have less impact on soil because it has a better bearing capacity. But at the same time, all the weight of machinery still has to be supported by a certain volume of soil, so when it's dry it'll require less volume but the impact on bulk density will be greater.

"So it's important to work in conditions that aren't too dry or too wet but which sit in the middle. When the bulk density of the soil increases, so too does the mineral content in the volume of soil, meaning less space for roots and water holding capacity."



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Optimising establishment with a biological seed treatment is helping a golfer-turned-farmer stay competitive with his organic arable crops. CPM finds out more.

By Charlotte Cunningham

What do professional golf and agriculture have in common? Truthfully, not a lot. However, that didn’t stop Paul Dobson trading in one career for the other in a bid to achieve his life-long dream of being an organic arable farmer.

Today, retired professional golfer Paul manages the arable enterprise of the 243ha Oxney Organic Estate in East Sussex, while his partner, Kristin Syltevik, is responsible for the 14ha vineyard – one of the largest organic vineyards in the UK – and several holiday cottages.

“We took the estate on in 2009 and converted it to organic in 2012, certifying

with the Soil Association and Countryside Stewardship Scheme,” explains Paul. “For us, the organic aspect has been a lifestyle choice – if we were to become farmers, we had to be organic. That meant minimising the use of fossil fuels, using zero pesticides and focusing on natural methods. These are all at the centre of our farming practices.

“I’m a strong believer that nature works so much with us until we work against it. You just have to see that with climate change and how Mother Nature is fighting back.”

Insect predation

I quickly learnt that once you let nature do its thing, plants become alive with wild insect predation. You don’t have to use chemicals, there are other ways.”

Today, the arable enterprise has grown with a typical rotation comprising two years of red clover ley for nitrogen fixing, followed by wheat, spring beans, winter wheat, spring oats and then back to clover. “We’re also trying to put a cover crop between the winter and spring crops to both build organic matter in the soil and hold on to any nitrogen left over from the winter crop, that we can then utilise in the spring crop,” explains Paul.

As well as the cropping, the farm is alive with beneficial insects, hares, deer and birds, he adds. “So much so, that in a recent bird survey of the vineyards, we were delighted to discover we have some of the highest variety and number of birds of all vineyards in the UK. Such high levels of biodiversity we find in our arable system too.”

But like many organic systems, while biodiversity may be thriving, so too are the weeds, and this is where managing the weed seed bank and establishing a competitive crop that’s quick to get away is crucial, explains Paul.

“A lot of our problem weeds – thistles, docks and grasses – emerge after crop establishment and can have a huge impact on yield. Finding ways to get the crops and fertility leys up and away ahead of weed competition, and manage those weeds in-season, is imperative.”

To do that, as well as focusing on soil health, Paul has been using a combination of crop rotation, cover crops, inter-row hoeing, and finding ways to feed and stimulate the crop not the weeds.

In terms of machinery, he’s inspired by John Pawsey and had been using the System Cameleon to drill his crops, before

recently swapping to the Claydon Opti-Till. “We’re trying to retain weed seed in the top 5cm of the soil so we can kill it and deplete the seed bank. We leave the stubble after harvest and then create a false seedbed using the Claydon straw harrow. It creates a micro-till in the top 30mm of the soil that leads to fast, even weed germination and then we use it to rake out and destroy the weeds at the cotyledon to one leaf stage.

“In the past we’d be drilling around 20 October to give us a good window for stale seedbeds but with the wetter autumns we’re getting these days, we’d require a boat,” laughs Paul. “I aim to drill around 10 October before the weather turns. If I leave it any later I’d never get the crop in the ground.”

The typical plan is to establish the crop as soon as possible and then go in with the Claydon interrow hoe around March when most problem weeds have emerged. These are removed while they’re still small, before they swamp out the crop.

Just before drilling, Paul uses composted turkey manure to help feed the young seedlings and aid their establishment. “It was pointed out to me that in growing our

crops, everything goes back into the soil except the seed, which is an important source of nitrogen and trace elements that we are taking away. So as well as using fertility building leys under NUM3, we also utilise nearby turkey litter. Being organic, we have to leave it six months to compost.”

Faced with increasing challenges to his crop establishment, Paul has also been utilising the benefits of Interagro’s organic biostimulant seed treatment Newton, to help crops get up and away early and produce fitter, healthier, more competitive plants.

Stimulating peptides

Newton is a natural, 100% organic plant-sourced biostimulant seed treatment, comprising stimulating peptides to help crops thrive from day one, explains Stuart Sutherland, technical manager at Interagro. “Not only do these peptides ensure vigorous crop establishment, they also help to build stronger, healthier, more resilient plants that will thrive under stress, delivering higher yield and margin gains.”

Paul continues: “I always have my home-saved seed cleaned by Anglia Grain Services, but obviously in an



Anglia Grain Services recommended the use of Newton to help optimise emergence and establishment, so Paul Dobson treated half of his KWS Zyatt seed with it last year.



Retired professional golfer Paul Dobson manages the arable enterprise of the 243ha Oxney Organic Estate in East Sussex.

organic system you can’t put any chemical dressings on, so selecting and planting the fittest seed puts us in good stead.

“They use a gravity table which separates out really small seed from the big seed as it cleans. The small seed is put back on the seed stack in the grain store and we bag up the bolder grain for drilling.”

It was also through Anglia Grain Services that Paul first heard about Newton, who’d recommended it to help optimise emergence and establishment. “It sounded good, so of the 23t of KWS Zyatt wheat I had cleaned, half was dressed with Newton.”

Combining optimal seed size with Newton offers the best start to growers – particularly under challenging conditions – believes Matt Pickard, business development manager at Anglia Grain Services. “With the wetter winters and drier springs, helping crops to get up and away fast and put their roots down is becoming increasingly vital.

“Wetter autumns seem to be the norm which can lead to lazy roots. The roots won’t travel far to find water which can cause problems such as lodging, unused nutrients deeper in the seedbed, and if conditions change, there’s a risk of drought and stunted growth.

“Seed quality is important to get the crop away – if you start with bad seed or a bad start, you’ll always be trying to catch up and that’s not a good position to be in.”



Combining optimal seed size with Newton offers the best start to growers – particularly under challenging conditions – believes Matt Pickard.

▶ “Adding Newton to the seed means as well as providing big, bold, seed we can benefit emergence and rooting even further, which is what I recommended to Paul.”

Looking ahead to autumn, Matt points out that growers could also benefit from quality farm saved seed. “Reduced autumn 2023 sowings and quality challenges in certified seed crops due to the wet autumn, means an anticipated shortfall in certified autumn cereal seed,” he says. “Keeping farm saved seed this autumn is a good way to put you in control of your

seed requirements this autumn, while maintaining high quality standards.

“We always advise testing for germination and disease when farm saving seed as there are many seed and soil-borne fungal diseases which can severely impact yield and quality. Where necessary, we’d always recommend using an appropriate chemical dressing to protect the seed.

“If growers can’t or choose not to use a chemical dressing, at least with Newton it gives crops the best start to establishment. If we do end up with a wet autumn and you can’t get on to give crops nutrition, you’ve done your best to help crops put their roots down and access what’s naturally available.”

Despite adversity

Turning focus back to Paul’s Newton-treated seed, areas were planted as first wheat after a red clover ley, drilled into good moist seedbeds in ideal weed-free conditions. “The Indian summer we had that year quickly turned extremely wet and while parts of the field should have drowned – there’s one block that often sits wet and we don’t get much of a crop – where seed was dressed with Newton it grew away nice and strong to my surprise.”

Into winter, the block treated with Newton looked really well compared with untreated seed despite the horrendous autumn, notes Paul. “With Newton, we saw vigorous early growth and strong plants instead of thin, leggy plants.

“I didn’t pull plants, but knowing what I know now about Newton, I think the improved rooting must have played a part in improving the crop’s resilience and providing the means to a daily feed of deliciousness without having to do any work.”

Improving the ability of plants to root is not only crucial for nutrient uptake, but also improving soil structure and helping to build that crucial organic matter in the soil, he adds. “This is all part of keeping our soils in good health and where Newton fits in well. Our soil organic matter levels range from 4.5 to 8 which I think is pretty good. Once you can rely on nature, it’s amazing what it will give you.”

So what’s next for Paul? “This autumn, all of our wheat fields will be going into beans treated with Newton. We’ll also be home saving our wheat and when we have it cleaned, we’ll definitely be treating with Newton – 100%,” he says.

“I’ll also be aiming to drill crops early with the new Claydon drill while getting the interrow weeding to work better with the improved seed placement the new drill offers us with minimal disturbance.” ■

Pushing performance

At the heart of good crop production lies careful use of chemistry to protect the plant and maintain performance, right through the season.

But optimising the efficacy of plant protection products can be challenging, while increasingly restrictive regulations limit just how far you can go.

This series of articles explores the science behind the use of adjuvant and biostimulant tools to help power both chemistry and crop performance, as well as increase understanding of why they’re needed and what they do.

We’re setting out to empower growers and drive crops to reach their full potential. Newton is the natural, eco-friendly alternative to chemical seed treatment – or the perfect addition to – for growers looking for a sustainable alternative to synthetic inputs and healthier plants from seed to harvest.

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



Paul’s Newton-treated wheat grew up and away well, despite a challenging autumn.



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“ Since we started to highlight the issue we’ve seen a reduction in the number of cereal crops that are being reported deficient in magnesium.”

Tissue testing

A wealth of nutritional data has been collected during the past seven years, allowing the analysis of regional and national trends. CPM hears how one farmer has been contributing to the data set and the benefits tissue testing has had on his business.

**Janine Adamson
and Rob Jones**

Nutritional nuances

growing season and making subsequent corrections using regular foliar applications, something that’s supported by his agronomist Matthew Beech from Agrii.

Matthew says having used SAP testing through a previous farming role, he continued to have an interest in nutrition when he switched over to agronomy. And with Peter already undertaking tissue sampling before participating in YEN, it made sense to compare the two methods, so no stone was left unturned, he adds.

“The aim is to understand what’s going on in the crop to maximise output where we can,” explains Matthew. “We want to identify issues before we can physically see them in the field and address the ‘hidden hunger’ by delivering nutrition to the plant through its foliage for optimum uptake.”

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

But why did FMC commit to running such a programme? Chris says it began when the company started to see trends in nutrient analysis but didn’t have the information to back up such hunches. “We started to collect data with a view to building a picture of trends over a few years.

“At the beginning we only looked at

Finessing crop nutrient requirements through utilising regular tissue analysis has helped one East Yorkshire farmer to grow an award winning crop of winter wheat while contributing to a national data set.

Peter Southwell and his family run Sancton Hill Farm near Beverley, overseeing 250ha of arable cropping. A long-time participant in the Cereal Yield Enhancement Network (YEN), the farm won last year’s YEN award for the highest yield in the northern region with a 12.09t/ha crop of Champion winter wheat.

Peter credits much of his success to analysing crop nutrients throughout the

Tissue testing programme

Two years ago, Sancton Hill Farm teamed up with Chris Bond, product manager for crop nutrition at FMC, to take part in the company’s nationwide tissue testing programme. This was with the goal of improving the farm’s YEN results even further.

“With Chris, we had the chance to compare and contrast three different tests, including SAP and conventional tissue testing, as well as utilising his expertise in nutrition,” explains Peter.

But how do the tests differ? Conventional tissue testing reports the level of nutrients in a sample whereas SAP analysis has been coined as a blood test for a plant – offering



Peter Southwell won last year’s YEN award for the highest yield in the northern region with a 12.09t/ha crop of Champion winter wheat.

cereals, but since then testing has expanded to include a number of other crops. However, cereals is the biggest data set with almost 5,700 samples from seven years of testing," he says.

For the farmer or agronomist, sample collection is straightforward, says Matthew. "For both SAP and conventional testing, you put the sample in the bag, then into a pre-paid envelope, which you send off the same day.

"We take samples before each plant protection product application as most of the available nutrition products have good compatibility, allowing them to be applied at the same time as the fungicide programme, for example. This reduces the requirement for additional application passes with the sprayer.

"In some cases, we found the SAP testing detected deficiencies sooner than tissue testing. An example being, magnesium deficiency showed up at T0 with a SAP test but not until T1 from tissue testing."

The significant amount of data collated by FMC means Chris and his colleagues have seen both long-term trends and seasonal differences. "One message we've reinforced during the years is the importance



According to FMC's Chris Bond, a trend which stands out from the firm's latest data is the increase in crops short of zinc, something which has occurred during the past couple of years.

of applying magnesium throughout the whole season, not just at the flag leaf stage," he comments.

"Since we started to highlight the issue, backed by the results from the programme, we've seen a reduction in the number of cereal crops that are being reported deficient in magnesium.

"It has many functions, particularly its role in chlorophyll production and light capture for photosynthesis, but also releasing ATP (known as a cell's energy currency) in the photosynthesis pathway," explains Chris. "So if you don't have sufficient magnesium, your



For both SAP and conventional plant tissue testing, sample collection should be straightforward.



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Tissue testing

▶ plant is never going to grow to its full potential through the season, especially building proteins and producing yield.”

Another trend which stands out from the latest data is the increase in crops short of zinc, something which seems to have occurred during the past couple of years, says Chris. As a result, this has become a greater focus for the company.

“Although growers know zinc is important, it can be somewhat overlooked. However, it’s involved in a lot of biological processes such as early root development, plant hormone production, cold stress responses, building chlorophyll and activating the enzymes necessary for protein synthesis, so any increase in deficiency is a cause for concern.”

This year has also seen more crops with below optimum levels of sulphur

and boron. “This is likely to have been caused by the extended wet weather we’ve experienced with the boron and sulphur potentially leaching from the soil. Because zinc becomes insoluble in cold, wet soils, it’s then unavailable to the crop,” explains Chris. “The cold weather also slows the biological processes in soils, which will further reduce zinc availability.”

Having such a comprehensive data set has allowed FMC to analyse regional trends around the country too. For some nutrients such as zinc, copper and sulphur, a north-south divide is becoming evident, with crops in the South and East often containing lower levels.

Elsewhere, the North-East (including Yorkshire) has shown lower than average levels of magnesium deficiency during the past seven years alongside boron

and manganese deficiency. However, there’s generally better levels of in-tissue nutrients than the national average.

“Although zinc levels are better than the national average in the North-East, it’s still a relatively high level of deficiency,” comments Chris. “At the same time, you’d expect manganese issues on the sandy and high-pH chalky soils which are common in the region.”

Manganese deficiencies

Reflecting on these results in respect to his farm, Peter says testing during recent years has detected the classic manganese deficiency you’d expect on the Wolds, as well as some issues with zinc and copper, particularly in dry springs.

“This year, with it being wetter, while we did detect some issues with zinc, we didn’t see the low levels of copper we might otherwise have expected, which then makes it harder to know if we should be applying foliar copper as a precaution,” he continues.

“During the years we’ve started to build up a pattern, but there are differences each season. For example, this year we had low levels of calcium which we haven’t seen previously.”

Matthew adds: “We’ve seen a few different issues this year that we didn’t expect, and those differences each season underline how important constant monitoring is to know what’s actually going on in the crop.”

Where growers experience micronutrient deficiencies, the use of foliar products is one of the easiest ways to correct problems during the growing season, suggests Chris.

“You’re applying a relatively small amount of that nutrient to take the crop from deficiency to sufficiency, and are bypassing problems in the soil such as temperature which may be causing that deficiency in the first place,” he stresses.

This has been the approach adopted by Peter, who says he uses FMC Zinic as a source of foliar zinc. “Last year we also used the FMC Magnor magnesium product. By the time we’d got to the end, testing at T3 showed that we’d pretty much cleared all of the nutritional deficiencies in the crop. Nortrace Uptake Plus (phosphate) and Feeder K (potassium) from Agrii were also applied when necessary,” he comments.

Matthew says the farm has an issue with phosphate due to the calcareous nature of the soils, which lock-up quickly if TSP (triple super phosphate) is applied. “We can’t meet all of the crop’s demand through foliar applications, so are using digestate



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Uplift in speedy SAP

SAP analysis is becoming increasingly popular among UK farmers looking to use data to make more informed decisions and better improve crop quality, yield and profitability, says Omex's Scott Baker.

"It's now playing a role in strategic management – SAP testing is used to identify the reasons why a crop might not be performing to its potential, but is also being used successfully ahead of key fungicide timings so required nutrition can be added into tank mixes for optimum efficiency and output," he explains.

With UK-based lab facilities and 30 years of experience, the company says it recognises the requirement for the rapid turnaround of results which can then support timely decision making.

Omex's head of research and development, David Booty, explains: "It's crucial farmers are supplied with accurate data which is what we're able to provide. But not only is data accuracy important, the speed in which we supply that data to is also critical.

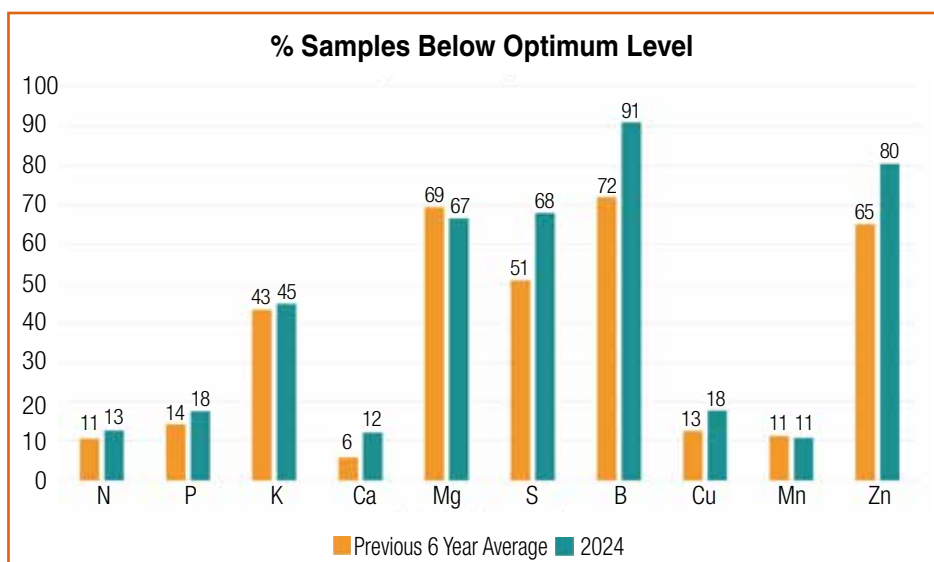
"SAP Analysis is carried out at our dedicated laboratories and the results are sent back to the customer within 72 hours, allowing real time refinements to nutrient programmes," he explains.

Each report indicates the levels of NO₃, NH₄, P, K, Mg, S, Ca, Na, Cl, Mn, B, Cu, Fe, Zn, Mo, Al in an easy to interpret bar chart, as well as pH, with interpretation conducted by a team of qualified agronomists.

"SAP is becoming an increasingly powerful tool on farm, thanks to the rapid turnaround we're able to offer," concludes David.



SAP is becoming an increasingly powerful tool on farm, thanks to the rapid turnaround Omex is able to offer, says the firm's David Booty.



National crop tissue testing results. Source: FMC 2024.




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Tissue testing

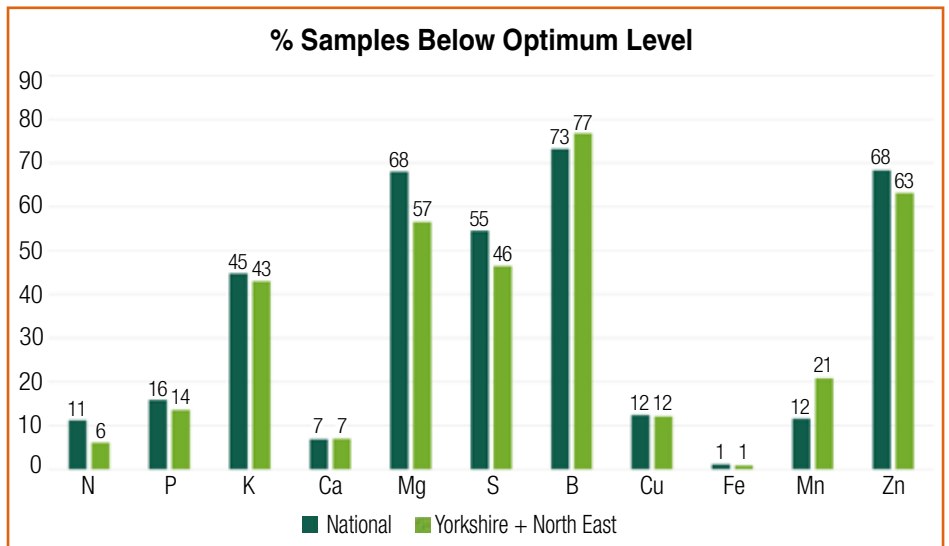
► in the rotation to try to build the indices in the soil through organic sources.”

He adds there was a particular focus on magnesium and zinc last year, the success of which was demonstrated by the resulting crop yield and grain analysis results, which showed protein, magnesium and zinc levels all at the higher end.

“It was encouraging to see in the grain analysis from the YEN report, showing we’d met the demand of the crop through foliar applications driven by the analysis results, ensuring nutrient deficiency wasn’t the limiting factor on yield,” comments Matthew.

Furthermore, Peter says grain phosphate results were above average, which given the relatively high yield for the year, showed the crop had utilised what was applied. “I don’t want to use a lot of bagged nutrients – phosphates in particular because they just get locked-up – although we’ll apply DAP down the spout when drilling oilseed rape or spring barley to feed the crop from underneath, while continuing to use digestate and compost.

“We also practice minimal ‘scratch’ tillage, so tend to keep nutrients in



Tissue testing results national versus Yorkshire & North East. Source: FMC 2024.

the top layer of soil and recycle them as fast as we can,” he explains.

While the historic focus has been on crop testing, Matthew adds that the farm is also looking to improve nutrient use efficiency (NUE). “This year we applied fulvic acid with the foliar nutrient applications to

try and improve uptake by the crop.

“We’re also undertaking trials looking at the level of bagged nitrogen versus foliar nitrogen – again with the addition of fulvic acid – and will analyse the grain at harvest to assess NUE and compare that with the field yield maps,” he concludes. ■

FieldSense launch

‘Precision in partnership’ is the promise from agronomy firm ProCam, having launched its new precision farming tool – FieldSense.

The platform is the latest in a family of services following the reveal of SoilSense last year, says managing director, Alex Collingwood. “FieldSense isn’t a data collection exercise, its aim is to add value to farming businesses through meaningful, achievable information which enhances agronomic advice.”



With no official packages or tiers, ProCam’s Nigel Scott says FieldSense is completely flexible without growers having to lock in or commit.

And rather than being rolled out from the ‘top down’, it’s been developed in close conjunction with agronomists and farmers. “That’s perhaps why we’re a little late to the party – we’ve taken time to work with growers to test and develop the system,” says agronomist for the North East, Nigel Scott.

“The concept of FieldSense is to provide a farmer-focused digital platform where growers work together with their agronomists for in-depth insight. All data is important, but agronomic knowledge is key,” he adds.

In terms of functionality, FieldSense offers a range of pick and mix services, which Nigel says are fully customisable. These include variable rate nitrogen applications using NDVI, soil sampling to 1ha grid, variable rate lime, P & K from soil test results, variable rate seed using satellite performance maps, and yield mapping data input.

Information is held in an app and hosted on the cloud and once in use, FieldSense can generate concise reports to assist with record keeping. It can also be integrated with Gatekeeper or other popular digital platforms.

“Importantly, there are no official packages or tiers, it’s completely flexible without having to lock in or commit,” adds Nigel. “It’s not just for large-scale operations, it’s ideally placed to work with



FieldSense isn’t a data collection exercise, its aim is to add value to farming businesses through information which enhances agronomic advice, says ProCam’s Alex Collingwood.

smaller or mixed farming systems too.”

Furthermore, growers can trial a small area of their cropping rather than the whole farm, accommodating those who are just beginning their precision farming journey. The pricing structure reflects this, with growers only paying for the modules being used, says Nigel.

“As agronomists, we’re often at the kitchen table working with multiple generations of farming families. Being able to continue to use that knowledge, supported by FieldSense, is what can deliver strong results,” he concludes.



“Through this rhizophagy cycle plants can access a lot of nutrients, especially some of the micronutrients that are hard to get.”

Attracting soil microbes

Rhizophagy cycle

The role microbes play in plant growth and nutrient acquisition is a relatively recent discovery. *CPM* talks to researchers about endophytes and rhizophagy.

By Mike Abram

Just how plants are fundamentally linked to and rely on microbes is only just starting to be understood, partly thanks to research by a relatively unknown professor from Rutgers University in New Jersey, USA.

Professor James White has been researching endophytes – microbes that live in plants – for most of his 45-year career. This began with endophytic fungi in grasses before more latterly concentrating on bacterial endophytes in plants. “These endophytic fungi and bacteria are all over and inside plants but cause no disease, instead, they’re beneficial,” he explains.

In fact, they’re vital to plant life and function. For example, without microbes, plants wouldn’t produce root hairs. “The root hairs only form because bacteria are inside the root cells and those bacteria secrete things like ethylene or nitric oxide which trigger the root cells to form hairs,” says James.

That was one of his discoveries after building on an initial observation made by a group of Australian microbiologists in 2010, of how plants seemed to absorb microbes through their root tips.

This rhizophagy process is a cycle beginning with plants releasing exudates – sugars and other edible material – that attract soil microbes. It’s mostly bacteria, although fungi also follow the trail of nutrients secreted from the plant.

“When they get to the tip of the roots the plant then sucks some into the root cells. How that happens we don’t know, but we can see them going in using florescent and other dyes,” he explains.

Reactive oxygen

Once the microbes are internalised into the root cells, the plant begins to extract nutrients from them using reactive oxygen, superoxide, which removes the cell walls. “Some of these microbes will be fully degraded, while others will remain as naked protoplasts – bacteria without a cell wall,” adds James.

Secretions made by the microbes in the cells then trigger root hair formation, he says. “As the root hairs grow, some of the microbes are ejected back out of the roots into the soil where they acquire more nutrients and are attracted back to the root tips.

“And through this rhizophagy cycle plants can access a lot of nutrients, especially some of the micronutrients which are hard to get, such as manganese, iron, zinc and also sometimes calcium.”

The cycle shows how plants directly use microbes from soils, explains James, making a direct connection between plant and soil microbiology. “I consider it a vindication for what organic and more latterly regenerative growers have been saying – that it’s not necessarily about chemistry, it’s about microbiology.

“It’s the basis for biological agriculture and we can use microbes to grow healthy,

nutrient-rich and stress-hardy crops. It also gives promise that we can grow crops without all of the environmental degradation which occurs when using chemical fertilisers and pesticides,” he suggests.

Applying chemical fertilisers diminishes the rhizophagy cycle in plants, continues James. “When we apply chemical nutrients to plants they no longer require the rhizophagy cycle, so they absorb fewer microbes and don’t have to degrade them. In the long-term, plants will lose access to those microbes if we continue to use a lot of chemical fertilisers.”

But as well as supplying nutrients, the rhizophagy cycle has other potential benefits for plants including making them more resistant to abiotic stresses such as drought and extreme temperatures.

“The process when the plants are using superoxide to get the nutrients out of the microbes makes them more resistant to oxidative stress because they have to upregulate their own oxidative stress mechanisms



Maximising the rhizophagy cycle on farm starts with soil health, says Rutgers University’s Professor James White.

Rhizophagy cycle



The more cover or companion crops in a field and around a cash crop, the more endophytes the crop can actually get.

▶ and produce more antioxidants.

“They become richer in phenolics and other antioxidants such as flavonoids and terpenoids, which means they are less susceptible to oxidative stress, and become more resilient.”

That also could help crops to become more nutrient-dense, he says, as those compounds are important nutrients for human health. Rhizophagy also plays a role in plant disease tolerance, with plants which are full of microbes being more resistant to disease.

“It’s because of a couple of reasons. One, because the microbes colonise the fungi and when they do, they change the behaviour of the fungus making it less virulent.

“The microbes don’t kill the fungus, but they tend to affect their development and make it less likely to cause disease. For example, if a pathogen can get its nutrient from endophytic bacteria it doesn’t have to attack plants to get those nutrients,” he claims.

“There’s also an indirect effect related to the hardiness of the plant. Many pathogens, when they cause disease, infect the plant producing reactive oxygen and inciting disease. But when the plant is oxidative resistant, the fungus doesn’t really achieve this.

“So one effect is that it strengthens the host so there’s less disease, and the other effect is changing the behaviour of the pathogen to make it less pathogenic,” explains James.

He’s tested that theory by taking microbes from a land-race corn grown in Mexico and Peru where fertilisers are used much less, and put them on a seed of a cultivated plant resulting in lower disease and healthier seedlings.

However, maximising the rhizophagy cycle on farm starts with soil health,

he says. “Maintain and build soils, increase organic matter and treat soils to preserve the microbiology; don’t over-fertilise or use excessive herbicides.

“Grow cover crops – these are sources of endophytes that come out of plants into the soil and can be shared between plants. The more cover or companion crops you have in a field and around the crop, the more endophytes the crop can actually get. These are all practices which work effectively.”

Further nuances

He also suggests that compost teas, particularly applied to seed, can be effective. While farm-saved seed normally carries more natural endophytes than bought-in seed – and landrace varieties more than commercially bred varieties – the process of harvesting seed and storing it will naturally reduce endophytes.

This is because in nature, the microbiome will develop over time as the plant holds onto the seed, and then where it drops in the soil, he explains. “But when we take seed, typically as soon as it matures, we dry it and store somewhere cool and dry where the microbiome doesn’t continue to develop.

“We diminish it even more if we do any seed cleaning, which is often undertaken to try and destroy pathogens on the seed. But the answer isn’t sterilising seed, but having more microbes. The more bacteria on the seed along with potential pathogens, the less pathogenic those microbes are.”

That makes finding a way to allow endophytes to proliferate on seed commercially or farm-saved, given the constraints farmers face, difficult, he admits. This is why applying compost teas or extracts from techniques such as Johnson-Su composting can be a useful kick-start. “You’re fortifying seeds

Non-legume nitrogen-fixing



Work undertaken by Dr Sharon Doty from the University of Washington suggests endophytes have been proven to fix nitrogen in the shoots and roots of non-leguminous plants.

Endophytes have been proven to fix nitrogen in the shoots and roots of non-leguminous plants by another pre-eminent researcher in the field, Dr Sharon Doty from the University of Washington. The work behind this was shared during a recent webinar hosted by Unium Bioscience and the British On-Farm Innovation Network (BOFIN).

Sharon explained that her team isolated nitrogen-fixing bacteria from pioneer plant species such as poplar or willow trees which can grow in the barest of substrates where there’s little or no available nitrogen.

Inoculating these bacteria in other plants and crops has shown the endophytes have a broad host range including grasses and even conifers, she continued. “In rice, we’ve shown they increase tillering and total biomass.”

Various strains are now being commercialised by US firm Intrinsic Bio, partnered by Syngenta to expand reach. “This is a new frontier of agriculture,” added Sharon.

with a healthy microbial community.”

Commercially available biostimulants could also be used to boost the rhizophagy cycle, he adds. However, once the process has started, the plant will naturally select for the community it requires and those microbes will move through the plant rather than the initial applied inoculant, he concludes. ■

Let the battle commence

Grassweed control survey

In what's been a challenging season to say the least, *CPM* looks at how the ever-changing climate has impacted weed pressure this year as well as the proactive steps growers are taking to win the war against grassweeds.

By Charlotte Cunningham

Casting back to autumn 2023, good stale seedbeds and plenty of soil moisture had growers' hopes pegged on a promising season ahead. However, after several years of kind autumns and springs, few anticipated such stark contrast this season with storms wreaking havoc for drilling and autumn herbicide plans, which had a knock-on effect – largely in terms of grassweed control.

A recent survey carried out by *CPM* and BASF delved further into the impact of the season, starting right at the beginning with stale seedbeds and winter wheat drilling dates.

According to the survey, 48% of those who created stale seedbeds said they were quite satisfied with the weed flush ahead of drilling and the majority of growers (51%) had wheat in the ground during the first two weeks of October.

A small proportion (8%) were as late as mid/end of November, highlighting the challenges of the season, says John Cussans, weed scientist at ADAS. "As

ever, every farm is different. But what we do know is there were definitely a lot of people who struggled with both drilling and getting herbicides on. Though many farmers would have been in a reasonable position going into the autumn, worst-case scenario this season saw people either get nothing drilled or not apply any chemistry until the spring."

Positive messages

BASF's Stuart Kevis concurs: "Considering the autumn we've had, it's always reassuring to see so many people did get crops in the ground – 90% in total by the end of October. Storm Babet hit around 18 October so anyone who was aiming for that later, delayed window may have been caught out.

"One positive with the stale seedbeds this year is that the soil moisture meant they were, in general, much better than the previous year. Last season was very dry meaning lots of growers didn't get the blackgrass chit and the glyphosate didn't really do as an effective job."

Among those growers who did get crops in the ground is Freya Morgan. Farming 1600ha in Bedfordshire, Freya's rotation typically consists of winter wheat, winter and spring barley, oilseed rape, winter beans and spring oats. This year she had all but 20ha of wheat in the ground, by the middle of October.

However, even for those who did get crops in the ground, the knock-on effect of poor conditions after drilling and delayed herbicide applications has been increased weed pressure and poor control, with all growers noting the presence of key weeds including blackgrass, ryegrass and brome in their winter wheat areas this year.

But how does pressure compare with a typical year? Perhaps rather interestingly,

"We as an industry should pat ourselves on the back with how far we've come with regard to IPM."

almost 40% of growers said their blackgrass pressure was much higher than last year. Brome pressure was deemed slightly higher by 23% of growers, while the majority (35%) said ryegrass levels remained largely unchanged. In terms of pre-em applications, the majority of growers (57%) said they planned and applied their autumn pre-em on time, while the rest didn't, once again highlighting a mixed picture.

Although conditions have exacerbated the prevalence of weeds, Stuart says it isn't totally unexpected. "Thinking back to the previous year – autumn 2022 – stale seedbeds didn't work as well which put a lot of pressure on herbicide chemistry and left many feeling they weren't as robust performance-wise as they could have been," he suggests. "The impact of this, was quite a lot of blackgrass heads in May/June time and therefore a high seed return going into autumn 2023.

"We've been building towards a high-pressure year, which – on top of the weather – has led to such widespread challenges with weeds this year, particularly blackgrass."

Looking at how the pressure has changed since January/February, blackgrass remains in the spotlight with 55% of growers saying the pressure is higher than they originally thought. Almost a third (32%) said brome pressure is also greater than they anticipated and 25% said the same for ryegrass. "It's important to separate out the species here," notes John. "Ryegrass and rye and meadow bromes germinate later



The UK has been building towards a high-pressure year, which – on top of the weather – has led to such widespread challenges with weeds this year, particularly blackgrass, says Stuart Kevis.

Grassweed control survey



The ultimate challenge with grassweeds is that if you don't apply pre-em's as planned, then it can be really devastating for control, warns John Cussans.

so we're likely to see that flush later on."

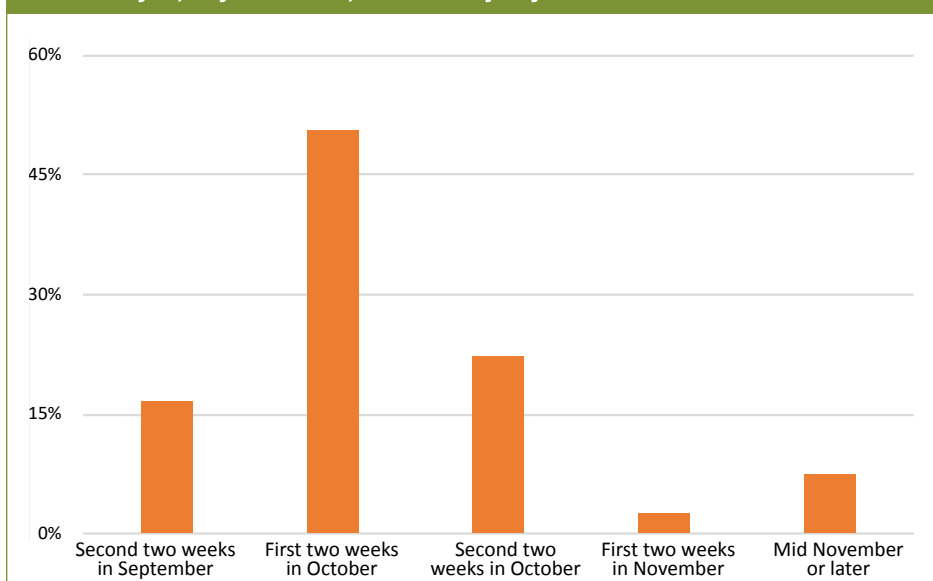
With regard to the blackgrass, Stuart says this increased pressure is perhaps an indication of continued weed germination throughout the spring, and with few-to-no post-em options, this reinforces the importance of 'throwing everything you can' at the crop in the autumn.

John continues: "The ultimate challenge with grassweeds is that if you don't apply pre-em's as planned, then it can be really devastating for control."

Freya is among those who noted higher blackgrass pressure than initially expected this year. "We tend to delay drilling the worst blackgrass fields until last, but we probably shouldn't have done that this year as we couldn't control the blackgrass in these areas. This was made worse by the fact we didn't get pre-em's onto these fields either."

That said, it's ryegrass which has proved particularly problematic this season, she continues. "We don't usually suffer from that

When did you, or your clients, drill the majority of winter wheat in autumn 2023?



much, but I think because it was so wet, and then we had a very mild winter, it didn't help."

Increasing risk

Stuart warns that if this ryegrass pressure becomes more of a general issue, there could be control concerns. "The worry is, it's a harder weed to control than blackgrass due to its protracted, sustained germination period."

Of course, taking action against weeds doesn't just incorporate chemistry and the importance of a strategy which involves IPM techniques has been a focus for many during recent years.

Everything from rotational ploughing to stale seedbeds, spring cropping and delayed drilling, were all highlighted as regular tactics in the IPM approach, albeit a growing percentage said they'd be undertaking more of these

measures this coming season.

"A multi-faceted approach is very much the strategy here – with blackgrass particularly, one measure just doesn't work on its own," says Freya. "Where we did get pre-em's on this year, we have managed good control of blackgrass, but that's down to the combination of measures we use like spring cropping, for example."

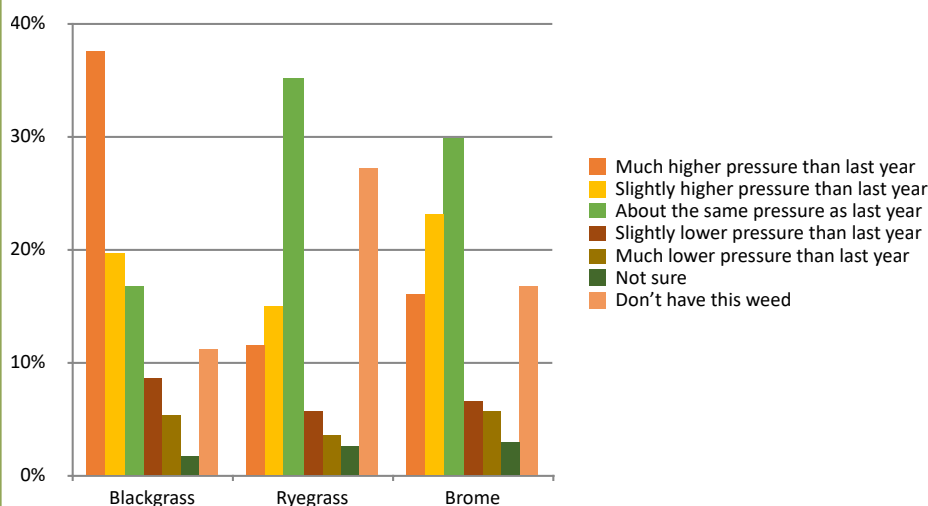
Looking at the opportunity to tackle weeds pre-harvest, slightly more growers said they'll aim to carry out roguing, spraying off the worst patches – or whole fields – this year, while 36% said they'll also consider mapping high pressure areas. This is in contrast to 29% who did this pre-harvest last year. "We've sometimes found you have to plough to reset, so we do use rotational ploughing on the worst areas where required," says Freya. "But that's not something we'd want to do every year."

With a number of tactics being deployed already, Stuart says it's good to see there's a zero tolerance to grassweeds. "I think the increase in spraying off whole fields is likely to be a reaction to the autumn – there's been a lot of talk of people having to 'reset' fields. It's a drastic approach, and not nice, but long-term there'll be a benefit on high pressure farms."

For those growers who choose to venture down the path of mapping high pressure areas, Stuart says it might also be an apt time to test resistance levels. "It can be complex, and populations within fields do vary, but getting a very broad understanding of what chemistry and modes of actions will and won't work is a very useful tool for growers."

While the 'best' combination of IPM techniques will vary farm-to-farm, John says the overarching message is a

Overall, how would you describe the weed pressure in your winter wheat, compared with the same time last year?





Freya Morgan says she'll be using Luximo once again this autumn after seeing good results this year where it was applied, despite the difficult circumstances.

positive one for agriculture as farmers are making such concerted efforts to tackle weeds. "The picture across the response to this survey is a gradual uptick towards more attention to detail."

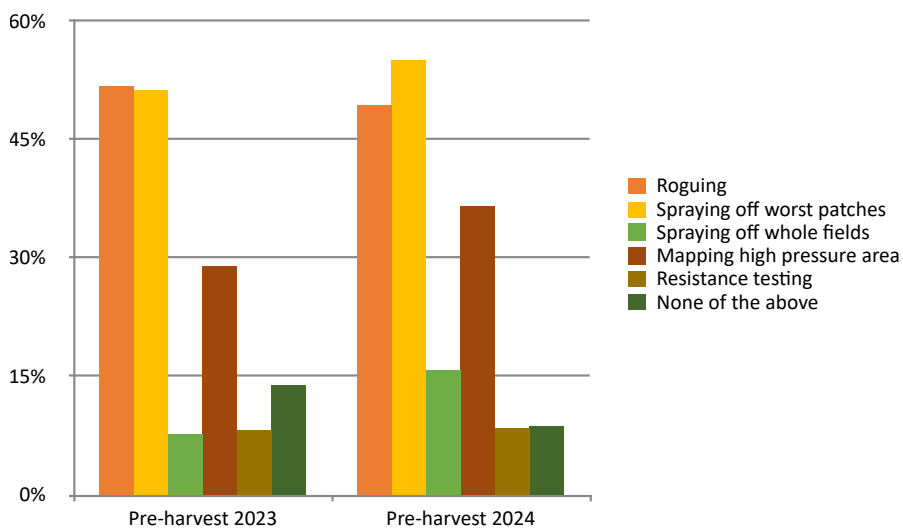
IPM success story

"I think we as an industry should pat ourselves on the back with how far we've come with regard to IPM – it's not something that's done just in a reaction to a bad year, it's becoming really embedded in the ethos of farming."

When a sound IPM strategy is in place, good chemistry is primed to be even more effective, continues John. And since its launch two years ago, BASF's Luximo/Luxinum Plus (cinmethylin) has been hot in the headlines, offering growers grappling for grassweed control an additional tool in the armoury in the form of a new mode of action.

Half of growers surveyed revealed

Which, if any, of the below IPM techniques did you implement in your winter wheat crop pre-harvest 2023, and which have you implemented/are planning to implement pre-harvest this year?



they indeed tried the new active on their winter wheat area this year, but 50% didn't – so what are the benefits for those who are yet to try it?

Luximo is a residual herbicide for the control of blackgrass, ryegrass, annual meadow grass, bromes and poppy in winter wheat and spring barley, designed to be used as part of an IPM strategy. "I'm surprised more people in the survey haven't at least tried it," says John. "It's good chemistry and I'd say if you have Italian ryegrass, specifically, causing an issue on farm, then you really should be using it in those fields."

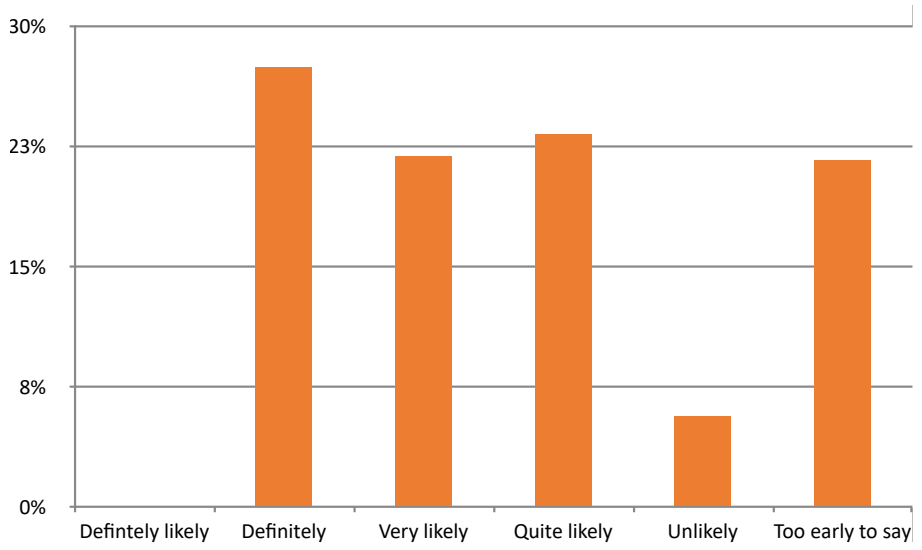
Looking at the plans for this coming autumn, while the jury is still out for 22% of growers, the majority (a combined 73%) said they're likely to use Luximo. "The data sets we have are really consistent

– Luximo has set a new benchmark for soil residual chemistry," says Stuart.

"Trial work shows it outperforms flufenacet. A Luximo-based programme applied pre-em is the best start you can get to your winter wheat grassweed control programme. If you're not using the best, you're behind the game plan from the get-go."

Freya says she'll be using Luximo once again this autumn after seeing good results this year where it was applied, despite the difficult circumstances. "I was a little concerned through the winter that everything would be washed away, and we wouldn't have any residual activity, but that proved not to be the case. It's given us another tool in the armoury to help us keep some of these challenging weeds at bay. We'll definitely be using it again this autumn." ■

How likely are you to use Luximo this coming autumn?



Winner announcement

Congratulations to prize winner Adrian Dixon from Hampshire who responded to the CPM/BASF survey and provided insight on grassweed control. Adrian has won an iPad Air, worth £599.

He answered the tie-breaker question of "What weed control tactic has been a gamechanger in helping you get on top of a grassweed problem?" With: "Attention to detail and using every opportunity to combat the weed. Delayed drilling in association with the best chemistry would rank as highest priorities."

To engage with future surveys, visit the CPM website and sign up to the newsletter.



“ It’s the underlying competition between the crop and the weed – what herbicides do is manipulate that in favour of the crop. ”

Weed management

Seed return concerns

Following a year of high grassweed pressure backed by limited success in pre-em applications last autumn, it seems as though a higher than average seed return is on the cards for many. CPM investigates ways to get back on track.

By Janine Adamson

Not only did conditions last autumn cause havoc with drilling, but the relentless wet weather also hampered some growers’ ability to apply pre-emergence herbicides to regain control of proliferating grassweed populations.

And for those who did travel and apply chemistry, depending on drilling date, crops may have struggled, providing little competition in high blackgrass situations.

So in many instances, this makes for two back-to-back years of poor grassweed control, meaning there’ll be higher than average seed return entering the coming season, says weed expert, Will Smith.

Additionally, due to the adverse ground conditions last autumn, some remedial

cultivations could be required to rectify wheelings and restructure soils following waterlogging. However, this could also prove an opportunity to get back on-top of grassweeds at the same time, he continues. “If you’re having to do that, could this be the year to undertake a deep cultivation and resurrect the plough? If so, it’s worth ensuring it’s done properly to deliver a true inversion.

“It’s also key to monitor for persistent species such as wild oats and broadleaf weeds which may emerge as a result, particularly if the plough hasn’t been used for a while.”

Elongating the opportunity

Where fields are in good condition, there should be an opportunity to utilise the stale seedbed technique, comments Will. “Growers will have to look for ways to manage this season’s seed return to elongate the opportunity for weed control, particularly for blackgrass, and this starts with post-harvest management.”

But, how to approach this depends on weather conditions at the time of the operation, he warns. “Where you have dry conditions, the first step will be to do nothing – leave seed on the surface in the case of blackgrass and ryegrass, to maximise predation as well as natural decay prior to any cultivation.

“Conversely, if soils are damp, then cultivating can help to encourage germination of weeds and volunteers

but remember, these cultivations have to be at no more than 5cm depth to avoid bringing older seed to the surface. By reducing the impact of freshly shed seed, it’s hoped growers can enter next season at net seed-bank levels.”

Although Avadex (tri-allate) is a familiar product for many, this year could see it particularly prove its worth, adds Will. In his role as technical lead at Gowan, he says the company recognises it’s an additional product within programmes, but believe it can play a role in a ‘weed reset’.

“In high grassweed situations, we see an uplift of control across all species including brome, which is a benefit that other actives might not offer to the same degree.

“Particularly for those who did miss



According to Gowan’s weed expert Will Smith, remedial cultivations could also prove an opportunity to get back on-top of grassweeds at the same time.

their pre-em applications, Avadex is an effective broad-spectrum herbicide which could assist in catching up on previous years of poor control," suggests Will. "For those without an applicator or with wider constraints, the liquid formulation (Avadex Factor) is also effective."

Avadex advantages

Association of Independent Crop Consultants (AICC) member, Jonny James of CCC Agronomy, agrees that Avadex provides an uplift across key grassweed species. "This is particularly the case where Luximo (cinmethylin) is the starting block for a programme," he says.

"An added benefit of Avadex is that there are no known resistance issues, so it's a very solid option. For weed such as wild oats, where control is becoming increasingly variable, the additional spend could indeed prove worth it this year."

According to a joint research project undertaken by NIAB and Adama, achieving optimum blackgrass control is down to manipulating crop competition, irrespective of drilling date. In fact, upping seed rates can also help crops to bounce back from potential damage,

as a result of high herbicide use.

The work was instigated after technical specialist Dr Bill Lankford noted that despite growers using more robust autumn herbicide stacks, blackgrass control wasn't always as expected. Together with John Cussans, a winter wheat experiment was designed to understand the potential contributing factors using extremes of variables, in hope of pinpointing the sweet spot.

"The trial was based around variable seed rates and herbicide treatment regimes across two drilling dates (mid-September and late-October). The aim was to understand the relationship between these three variables and the resulting impact on grassweed control," explains Bill.

Seed rates varied from very low (75 seeds/m²) to very high (600 seeds/m²) and herbicide programmes were designed to reflect low through to high input (see table). At high herbicide input, Bill says although the aim is to achieve ultimate weed control, when all applied together, there could be resulting crop safety concerns.

"Such a highly loaded tank mix isn't something which manufacturers would endorse and best practice is to sequence,



Adama's Dr Bill Lankford instigated a grassweed trial with NIAB after noting that despite growers using more robust autumn herbicide stacks, blackgrass control isn't always as expected.

but we have to acknowledge that due to resistance issues in post-emergence herbicides, more active ingredients are being added into residual stacks.

"Equally, drilling later can reduce the opportunities to make repeated residual herbicide applications," he adds.

With the results now in, John says at the heart of the findings is the importance of competition – both weed versus

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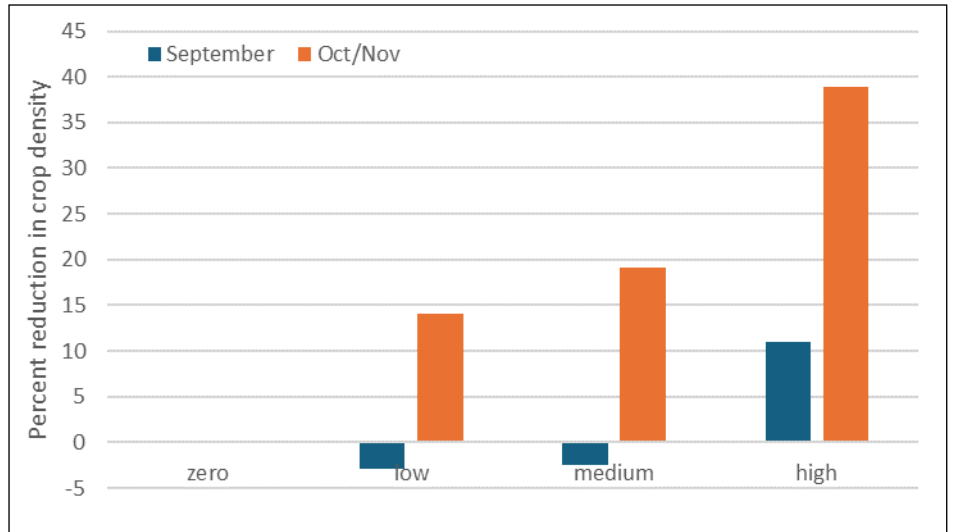


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It's well acknowledged that upping seed rates is a tactic against grassweeds, but what hasn't perhaps been understood is how it's compensating in two synergistic ways, says weed expert John Cussans.



Percentage reduction in crop density at different herbicide regimes for both an early and late drilled winter wheat crop. Source: NIAB/Adama 2024

► crop through seed rates and closing the gap on herbicide selectivity. "It's the underlying competition between the crop and the weed – what herbicides do is manipulate that by shifting it in the favour of the crop. Effective weed control is in fact an indirect result of reducing the weed size early doors," he explains. "But applying more and more herbicide doesn't always mean greater weed control and it can also have an impact on the crop, particularly sensitive species such as spring barley and

oats. Where herbicide begins to have a greater impact on crop suppressiveness than its efficacy – reducing weed seedling numbers – the eventual effect of weed control is reduced. So it's asking whether you can overcome that knockback through increasing the seed rate," continues John. Furthermore, Bill says the trial results indeed reflect this hypotheses. "What we see, using aerial RGB 'human eye' imagery, is the impact on crop vigour from the high input herbicide treatment is compensated for when increasing the seed rate. In fact, at

600 seeds/m², there's little to no damage from any of the herbicide treatments." Subsequently, John says his advice will now be for growers and agronomists to be bolder with seed rates. "It's well acknowledged that upping seed rates is a tactic against grassweeds, but what hasn't perhaps been understood is how it's compensating in two synergistic ways. "You could be looking to add up to 150 seeds/m² more in a high blackgrass situation," he suggests. "Equally, at low seed rates, all herbicide regimes had an impact on crop vigour."

Seed predation research

Explorative research is taking place to understand the role of seed predation across different tillage systems in a bid to support the future of sustainable weed control. The work forms the basis of Jasper Kanomanyanga's PhD and is being undertaken in conjunction with NIAB, Syngenta and Lincoln University. The aim of the research is to understand the fate of weed seed on the soil surface in terms of germination rate, predation and persistency. This is particularly relevant as growers adjust management approaches to include spring cropping and reduce soil disturbance. Weed seed predation by insects, birds and small mammals is a natural process which can contribute to weed suppression, but, tillage practices can have a significant impact on its dynamics, says Jasper. "To understand this further, work has taken place to assess weed seed predation in blackgrass, wild oats and meadow brome across different sites and two seasons (autumn

and spring). This included using the seed card method to compare predation levels in conventionally tilled fields versus long-term no-till, plus differing herbicide use. "So far, we've found there are higher predation rates in the no-till compared with fields under conventional management. We've also observed higher predation in the spring season rather than the autumn, although results varied across species and sites," he explains. As a result, he believes no-till systems can promote sustainable weed control through an increase in natural predation rates, which for some might go against the grain. "It's important to capture the positives and negatives of a change in system – it could be argued there's been a trend towards concentrating on the negative impacts of no-till on weed control. "Instead, this research demonstrates that there are benefits to be had which can accumulate over time," suggests Jasper.



PhD researcher, Jasper Kanomanyanga, hopes to understand the fate of weed seed on the soil surface in terms of germination rate, predation and persistency.

"Furthermore, a move to spring cropping could also enhance seed predation as a part of conservation ag practices," he concludes.

Different herbicide regimes (all applications made at pre-emergence)

Untreated control	-
Low input	Diflufenican plus pendimethalin plus flufenacet
Medium input	Flufenacet+ diflufenican plus aclonifen plus prosulfocarb plus pendimethalin
High input	Tri-allate plus cinmethylin plus pendimethalin plus diflufenican plus prosulfocarb plus flufenacet

Weed seedling densities

As for drilling date, the trial also measured blackgrass seedling density at a high pressure site at Hinxton; counts were undertaken in December. Perhaps unsurprisingly, blackgrass populations were much higher at the earlier sowing date across all seed rates and herbicide treatments compared with 10 blackgrass seeds/m² or less in the later drilled plots (including untreated).

However, although blackgrass populations were lower at the later drilling date, the higher the herbicide input, the greater the reduction in crop density. Bill says this means despite drilling later being better from a starting point of weed pressure, if herbicide programmes can't be sequenced adequately due to a lack of opportunity, there'll be a considerable risk to crop safety.

"The trial indicates a

noticeable thinning impact as a result of all herbicide use at the later sowing date, reaching 40% at the highest input level," he says. "Therefore, drilling early and having a greater chance of sequencing and multiple applications, allows improved crop safety.

"From a practical perspective, this means that growers dealing with herbicide insensitive blackgrass could drill earlier than the end of October and still achieve good blackgrass control by focusing on reducing the seed-bank present at drilling and using different herbicide active ingredients in sequence, plus manipulating the seed rates."

The same can't be said for Italian ryegrass, stresses John, which was assessed at a site at Faversham. Due to inclement conditions during the trial period, while the weed seedling data from both drilling dates



During work conducted by NIAB and Adama, it was observed that although blackgrass populations were lower at a later drilling date, the higher the herbicide input, the greater the reduction in crop density.

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According to Jonny James of CCC Agronomy/AICC, it's important to balance the benefits of early drilling and the potential weed control gains against broader management challenges such as lodging and disease pressure.

could be reviewed, the later drilling date trial wasn't taken to maturity because of uneven establishment. Despite this, the relationship between drilling date and ryegrass control remains clear, adds John.

Bill agrees that with an increase in herbicide-resistant ryegrass populations, active ingredients continue to struggle to perform. "Drilling date is pivotal in combating this tough weed.

"With blackgrass, there's the flexibility to adjust and compensate which is a positive message, but herbicide insensitive ryegrass is just too difficult to control at an early drilling date. Growers won't see the return on investment from the inputs required."

To conclude, John adds there has to be an acknowledgement of how the weed seed-bank impacts the crop. "Historically, there's been a school of thought that it doesn't matter what the seed-bank level was, you'd achieve the required control from herbicides and all would be well.

"However, because this trial has illustrated the importance of manipulating crop competition, it's evident that the seed-bank population does have an impact. The real solution is to reduce that population in the first place," he says.

Reflecting on these findings from an agronomic perspective, Jonny says he's still reluctant to advocate early drilling when such a wide array of other factors are at play. "You have to balance the benefits of early drilling and the potential weed control gains against broader management challenges, whether that be lodging or disease pressure. As for upping seed rates, this

Liquid versus granule

Opinions can be split between whether to use Avadex Factor (tri-allate), the liquid formulation, or Avadex Excel, the granule version. While Avadex Factor can be tank mixed with most other pre-emergence herbicides, the higher loading of tri-allate in Avadex Excel has led many to stick with the granular application.

Reflecting on the performance in trials last season, Gowan technical lead, Will Smith, believes the performance of the two formulations is closer than previously believed. "It's pleasing that both Avadex Factor and Avadex Excel continue to deliver a significant benefit in weed control when used alongside other herbicide options as part of a grassweed control programme," says Will.

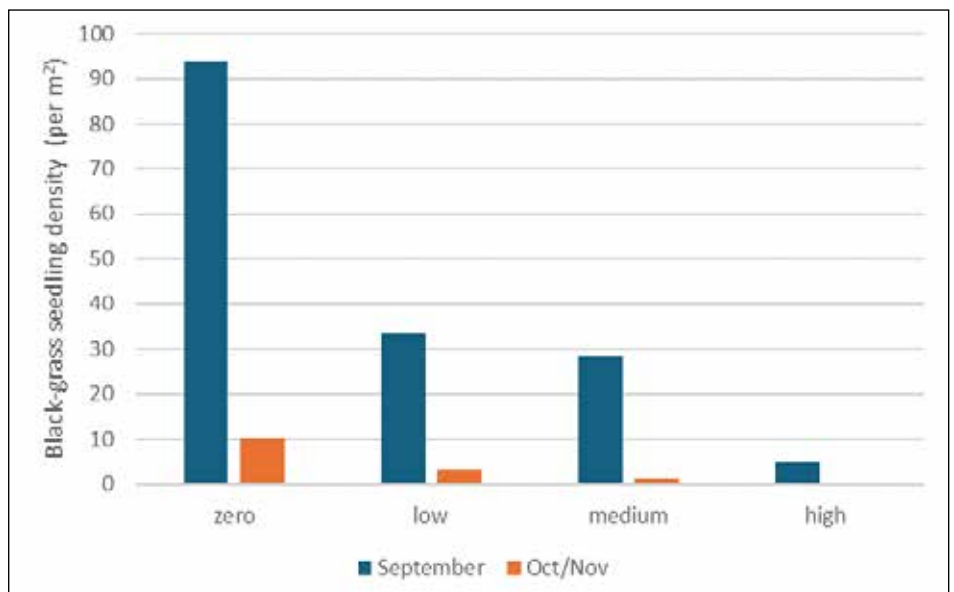
"This season we've observed that Avadex Factor is performing extremely well and, in some cases, even as well as Avadex Excel. This is a trend we've noticed during the past few seasons particularly when it's been wet at

drilling – our understanding is this is related to the formulation in these circumstances."

Will adds that overall, Avadex Excel tends to deliver better control across a range of situations. As such, he encourages growers who've invested in application equipment or have a good relationship with contractors who can deliver timely applications, to continue using Avadex Excel.

For those who don't have access to either of these, he explains that the positive results for Avadex Factor should provide confidence that grassweed control can be improved by including tri-allate in herbicide programmes. However, later drilling is where both products may sit alongside one another, says Will.

"It's very well drilling late, but programmes may look different in this situation. The weather may only allow one chance to apply herbicides. In this situation, Avadex Factor is a strong option for inclusion in a tank mix," he concludes.



Blackgrass seedling density at different herbicide regimes for both an early and late drilled winter wheat crop. Source: NIAB/Adama 2024

can have an impact on spec weights.

"There's also the issue of herbicide persistency and half-life – products don't have the same longevity when applied in dry conditions. This is especially pronounced in an active such as prosulfocarb (as in Defy) which is most effective in cooler, moister conditions," he adds.

And whereas grassweeds are usually the primary concern for most growers, Jonny highlights the increasing prevalence of

groundsel, poppies and other broadleaf weeds. "Populations of groundsel are certainly increasing but control using SU type herbicides is poor. This means there's an increasing pressure to maximise the potential of residual products.

"As a result, options such as Tower (pendimethalin+ diflufenican+ chlorotoluron) and Alternator Met (metribuzin+ flufenacet+ diflufenican) seem to be helping with the control of these weeds," he concludes. ■

Regaining control

“It’s been a really difficult year and on some farms, blackgrass control has probably gone backwards five years.”

With high levels of weed seed shed looming, what can growers do to get back on track with grassweed control? *CPM* asks two farmers to discuss their strategies, as part of this month’s Real Results Roundtable.

By Janine Adamson

Throughout the past year, continued rainfall has impacted the ability of many farmers to apply the required chemistry to their cereal crops, while conditions have favoured the proliferation of both weeds and diseases.

As thoughts shift to harvest and next year’s crop, what can growers do to get on-top of grassweed control and mitigate further population increases?

For this Roundtable, *CPM* brings together BASF’s agronomy manager, Hugo Pryce; Suffolk-based farm manager, Graham Thomson; and Yorkshire farmer, Richard Hinchliffe.

Graham is the farm manager at PC

Kindred & Son in Woodbridge, a system which operates across heavy clay soils to produce combinable crops, beans, sugar beet and grass seed, with the addition of an indoor pig unit. The farm has a ‘very strict’ policy when it comes to grassweeds, using the best chemistry alongside appropriate IPM techniques.

Richard oversees his 560ha family farm in Yorkshire and is a strong advocate for delayed drilling – even in clean fields work doesn’t start until mid-September.

The discussion for this Real Results Roundtable is getting on top of grassweed control in winter wheat and reflecting on this challenging year.

Current scenario

Hugo opened the discussion by sharing that where he is in Norfolk, there’s a lot of heavy land which tends to suffer from blackgrass, therefore, many growers aim to delay drilling. “However, Storm Babet arrived mid-October meaning in some instances, nothing had been planted before that.

“Seed was then perhaps often spun on resulting in fairly indifferent crops. Importantly, there hasn’t been the blackgrass control because it’s not been possible to apply post-em, which many expected to be able to do.

“It’s been a really difficult year and on

some of these farms, blackgrass control has probably gone backwards five years – there’ll be a massive seed return this autumn and fields which should have been whole cropped or completely sprayed off, weren’t,” he explained.

Richard agreed and said of his 560ha of cropped land, 150ha wasn’t drilled. Some has gone into winter bird food and the rest reserved for summer cover crops, ready for autumn 2024. “We’re the same as everyone else and have the



According to BASF’s Hugo Pryce, growers will be looking to achieve one, ideally two, stale seedbeds before drilling this autumn.



Because crops received only a pre-em application last autumn and top-ups were missed, farmer Richard Hinchliffe spent more time roguing this season than usual.

▶ good, the bad and the ugly. Crops which were drilled really early look decent, but what we've lacked is sunlight which is massively down this year and will have a significant impact on grain size and set.

"Blackgrass-wise, we have a zero tolerance regime so the only weeds left will be anything we've missed while roguing. But because we only applied pre-em's and missed our top-ups, we've spent longer roguing than usual."

In contrast, Graham said he has the lowest blackgrass pressure he's seen for some years. "We drilled relatively early (from the end of September) and have managed to apply all the required chemistry. It's not to say the crops look brilliant, but grassweed-wise, roguing has been negligible.

"The only concern has been a late drilled wheat after sugar beet where we couldn't apply herbicide – blackgrass has come up at what I'd class as a high level, for our standards," he added.

Integrated approach

Richard listed a host of tactics which he strives to deploy at his farm for grassweed management such as optimising the rotation, adapting seed rates and choosing robust varieties. He also highlighted the importance of machinery hygiene. "I like to ensure machines such

as combines are cleaned off in gateways due to them spreading seed around.

"In fact, we inherited a soft and meadow brome problem after having a demonstration combine on the farm, so that's something we wouldn't do again because it took a few years to get on top of. With us having a depleted grassweed seedbank, we can use no-till techniques but that means we're seeing a slow shift in weed spectrum, particularly broadleaf species."

Furthermore, he made the point that it's important to look beyond just blackgrass due to increasing populations of brome, rat's tail fescue and Italian ryegrass. "But diversity is key – nature loves everything being done the same because it has a chance to adapt to the conditions. Mixing things up always helps with control," he said.

Hugo added that he hopes growers see an early weed seed chit in the coming months. "They want to be able to stimulate germination of the seed that's been dropped and achieve one, ideally two, stale seedbeds before even thinking about drilling.

"Afterall, that was the problem in 2022/23 – it was so dry there wasn't a chit and by October, growers couldn't wait any longer."

While discussing how long to wait for a stale seedbed to deliver, Richard reminded the Roundtable of blackgrass' seed return and that it's critical to achieve 98% control to 'stay still'. "If you have 2% of blackgrass still coming through, you

still have a huge amount of seed return. The bar is so high that to get below this threshold, you have to effectively achieve zero plants left over in fields."

He also said he recognised there may be the temptation to drill early this coming autumn. "There's a lot of heavy land around this country and motivation this year will be to go and get that drilled up. Once you have a crop growing and established, it's a lot better than a bare field.

"But if people do this, they're just committing to spending big on inputs in bad blackgrass situations," commented Richard.

Programme choices

Historically, Graham said he'd use Anthem (pendimethalin) plus Liberator (flufenacet+ diflufenican) as the base of his grassweed control strategy. In some instances, he'd swap pendimethalin for prosulfocarb to provide additional ryegrass control.

But with blackgrass pressure increasing in autumn 2022 he turned to Luxinum Plus (Luximo/cinmethylin), although due to dry conditions success was limited. Having returned to use the active again in autumn 2023 following a recommendation from his agronomist, with good soil moisture, he's achieved excellent results – the equivalent of a reset.

"This coming autumn, we'll go again with Luximo and for the fields which require additional help, which I don't think there'll be many, we'll top-up with



Beyond blackgrass, populations of brome, rat's tail fescue and Italian ryegrass continue to rise.



In high blackgrass or ryegrass situations, Luximo can act as a good, starting building block.

Avadex Factor (tri-allylate),” he explained.

As for Richard, he said for the majority of the farm he uses flufenacet plus diflufenican (DFF) at pre-em followed by flufenacet plus prosulfocarb at peri-em. On the most challenging land or areas he’d consider Proclus (aclonifen) at pre-em, and also has the capacity to spot-treat with Avadex.

Having lost his Luximo trial area to flooding last autumn, Richard said he’s keen to keep the product in his ‘back pocket’ ready to add to his herbicide programme as required, or as a means of alternating modes of action.

“But because flufenacet plus DFF is a very cost-effective option, it means we do have funds available should we have to invest in more chemistry.”

In response, Hugo acknowledged the role flufenacet has played in forming the base of grassweed control programmes for the past 20 years. However, he believes Luximo offers a viable alternative for those struggling to achieve adequate control.

“Where you do have high blackgrass or ryegrass pressure, I

Luximo would prove a good, starting building block,” he suggested.

Richard pointed out that the reason he’s able to achieve results using a reduced pre-em input spend is because of years of proactive management. “We’re in a fortunate position, but if I was in a bad blackgrass situation I wouldn’t dream of using flufenacet plus DFF.”

Luxinum plus

From a trial perspective, Hugo added that Luximo’s performance far exceeds that of flufenacet. “If you have high blackgrass or ryegrass situations, in places where you can’t hand rogue, it’s a really strong active. Both in combination and in sequence with other products it should be the starting point for a lot of people this coming autumn.”

An additional benefit of Luximo is its direct activity on weed seed, which given the amount shed this year, is particularly relevant, he raised. “If you have weed seed on the surface and you’re in a direct drilling situation, which is becoming more popular, then you’ll achieve good efficacy from Luximo acting directly on the seed.

“The caveat to that is you have to ensure drilling depth is correct so the crop seed is covered. But certainly, BASF has conducted quite a lot of trial work which shows at direct contact with blackgrass or ryegrass seed, Luximo is giving significant levels of control.”

Recognising these benefits, Graham said it’s likely around half of his hectareage will be treated with Luxinum Plus this coming autumn, adding that the reason why he’s not going ‘full out’ is due to resistance management.

Hugo agreed with this point and added that new chemistry doesn’t come along very often so it has to be protected – used at the correct rates and in combination with other active ingredients. “Although Luxinum Plus’ label is more flexible than other products, the sweet spot is pre-em application – that’s the key timing to achieve real bang for your buck.

“In trials, we’ve consistently seen Luximo offer considerably greater control at pre-em as opposed to post-em. It’s taken up by germinating seeds and roots, not through leaves, which is why timing makes such a difference.

“It’s about managing risk – if you leave Luximo to post-em you run the risk of the weather closing in and not being able to apply the most effective chemistry. Get it on first, and you maximise your chances of getting the control you require.”



Leaving applications of Luximo to post-em can run the risk of the weather closing in and not being able to apply the most effective chemistry.

Having used the product for a couple of years, Graham confirmed that Luxinum Plus is easy to use from an operator’s perspective and has caused no compatibility issues. “We’ve had no problems using it at all,” he concluded. ■

Real Results Roundtable

BASF’s Real Results Circle is a UK-wide agricultural network now in its eighth year. The initiative is focused on bringing together growers, industry experts and BASF to create a more resilient farming system that’s sustainable for farm business profit, for the people we feed and for the planet we live on.

Real Results Roundtable is a new initiative which explores related topics, such as resilient disease control, environmental stewardship and return on investment. Roundtables centre around Real Results Circle farmers and associated experts from the wider industry.

By coming together to openly discuss and therefore face challenges as one, we can find out what really works and help to shape the future of UK agriculture.

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



“ Early monitoring after harvest and before drilling will be as important as ever this year given the potential for extreme slug pressure. ”



Slug control

Magic of movement

As drills start to roll signalling the start of another cropping cycle, CPM looks at what slug control learnings can be taken from last season when the pest wreaked havoc during crop establishment.

By Rob Jones

The adage of never making farming decisions based on the previous year could go out of the window this autumn, at least when it comes to slugs, as agronomists predict a repeat of 2023's severe pressure.

Advice is to be particularly hot on monitoring and risk assessments, while using all tools available including varying degrees of soil cultivation and slug pellet applications, to safely establish combinable crops.

AHDB figures recently published in July hint at what a challenging year it's been for arable growers, with wheat

and oilseed rape areas down 9% and 21% respectively, and the winter barley area also dropping by 11%.

It all began with a wet July 2023, when many growers gambled on OSR due to soil moisture being a prerequisite for rapid germination and growth away from pest pressure.

However, as Association of Independent Crop Consultants (AICC) member and NIAB southern regional agronomist Syed Shah explains, the damp field conditions that followed in late July and early August caused other problems.

Slug-central

“On heavier ground, growers lost crops completely from slug damage and had to re-drill, particularly where they were direct drilled and there was a lot of trash; it was a complete disaster,” he says.

When growers moved on to cereal establishment, winter barley crops drilled from mid-September onwards grew away well, but as rainfall set in during October, winter wheat crops were subjected to a perfect storm of three factors.

For one, waterlogging was common on heavier and/or poorly drained soils. Then, where residual herbicides were applied – particularly stacks containing cinmethylin – crop establishment was reduced.

Compounding these issues were slugs and Syed believes they were more of a factor in the establishment problems experienced last year than some believe. “Once drilled, it takes a long time for a seed to rot or crop to die from waterlogging. You could see a lot of seed hollowing and then grazing by slugs, which led to a lot of patchy and thin wheat crops,” he explains.

In the West, fellow AICC member David



AICC member/NIAB's Syed Shah says for those still to establish OSR, trash management is key including baling straw to reduce the amount of residue drills have to contend with.

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GROWING TOGETHER

Slug control

► Lines advises across Herefordshire, Shropshire and into Powys, and says his earlier drilled cereals that established and grew away before the rain fared okay.

However, where seed was pushed into poor seedbeds, which soon became too wet to consolidate with Cambridge rolls, he adds crops really struggled to survive the slug pressure that built during the extended period of wet weather.

"From my weather records, across the 155 days between 1 September until mid-February, I've totted up 39 days with no rain and in a typical year that would be the other way around. It wasn't that we've had horrendously wet months, more that we've had continuously wet weather and soils never dried out," says David.

Some of his growers fought against slugs with more applications of pellets than they've used for many years, which underlines the pressure which built over the autumn, he continues.

Since then, with no frosts or extended periods of dry weather to make a dent in populations, a huge number of slugs have been evident in standing crops right up until senescence.

"I think the slug pressure last autumn wasn't as high as it's potentially going to be this autumn. They've been allowed to breed and walking through crops recently, you ended up covered in slugs which is unusual."

So, what does this mean for growers as harvest reaches a crescendo and thoughts turn to 2024/2025? Syed says for those still to establish OSR, trash management is key, and he's been strongly advising



According AICC member David Lines, slugs have been allowed to breed and when walking through crops recently, he's been covered in the pest which is unusual.



Seed hollowing and then grazing by slugs led to a lot of patchy and thin wheat crops last autumn.

growers to bale straw to reduce the amount of residue drills have to contend with.

He also advocates a cultivation of some kind to manage trash and help reduce slug populations ahead of OSR establishment, as the crop is drilled at relatively low seed rates and can be wiped out incredibly quickly by the pest.

"It'll be disastrous if you spend money on expensive hybrid seed and multiple slug pellet applications and still lose the crop," warns Syed.

Soil movement benefits

ProCam agronomist Gareth Williams is based in Pembrokeshire and covers West Wales, advising on crops including winter and spring cereals, OSR, maize, potatoes, and field vegetables. He says last year, where cultivations were used, his clients were generally able to keep on top of slugs with ferric phosphate pellets and anticipates more soil being moved this year in order to relieve pressure ahead of drilling.

With populations already evident, he believes an application of pellets immediately after OSR is drilled is essential, alongside ensuring there's a high number of baiting points on the soil surface. This can be achieved using a mini pellet product such as Menorex (ferric phosphate), which offers 67 baiting points/m² rather than 42/m² offered by its standard sized equivalent SluXX HP (ferric phosphate).

"That'll help reduce the impact of the first wave of slugs. After that, closely monitor what's happening with the pellets and crop. If damage continues, then repeat applications are required until plants are beyond the vulnerable stage.

"The quality of the pellet is also important, as they have to last, particularly as we're in a high rainfall area," adds Gareth.

Looking a little further ahead to cereal establishment, cultivation and other stubble management measures are again going to be a key tool in trying to alleviate pressure in known high slug risk situations, suggests David.

A lot of soils have suffered structural damage, with some soil types capping off after the many months of persistent rain; sprayer and harvest traffic wheelings may also be deep in places. He says these areas may require remedial work and parts of fields that laid wet for much of the season should be assessed with targeted subsoiling and mole draining to help with the movement of water through the profile.

For direct drillers who are aiming to avoid any significant soil movement, David points out that the bare minimum should be the use of a straw rake – perhaps multiple times – ahead of drilling, or a light discing to around 30mm.

Furthermore, evidence from NIAB suggests such shallow cultivation after OSR harvest is particularly beneficial for the disruption of the cabbage stem flea beetle lifecycle. And given wheat after OSR experiences the highest risk from slug damage, this will have the additional benefit of alleviating that pressure by physically damaging slugs and their eggs.

With a lot of hard ground from excessive rain, shallow cultivation and raking will also help disc drills to find some tillth and reduce the risk of leaving a slot for slugs to move along and

hollow out seed, comments David.

"It'll be important to get volunteers to chit in stubbles, too. I think we'll have a lot of shed seed in the barley after OSR. Those that kill their volunteers off quickly with either glyphosate or another cultivation will have less slug pressure. It's logical that if there's nothing for slugs to eat, it'll help starve them out," says David.

While moving soil is key to reducing slug pressure, good seedbed quality, correct drilling depth and re-consolidation are also important in restricting movement of the pest once crops are drilled.

Syed says at least 2.5-3cm of settled soil should be on top of cereal seed which will help to prevent residual herbicide damage and ease slug hollowing. "I'd advise higher seed rates in fields where you know slugs are going to be a problem and rolling at least once or even twice at different angles where conditions allow will help to slow movement," he adds.

Gareth stresses that early monitoring after harvest and before drilling will be as important as ever this year given the potential for extreme slug pressure – populations in stubbles and after primary cultivations should be assessed using traps.

He says the industry only has ferric phosphate and although effective, its activity isn't as fast as previously available active substances like metaldehyde, so identifying problems early and getting ahead with pellet applications is key.

"There was a tendency to press the panic button with metaldehyde because you know there'd be dead slugs

everywhere the next morning. We now have to be on the ball a bit more with timing and quality of pellet. I tend to keep Menorex for OSR and then use Sluxx HP later on in cereals," explains Gareth.

Quality formulations

Last year, David says there were grumbles that pellets were disappearing too quickly, but he believes spending money on better quality pasta-based formulations like these should provide good results. "There has to be some common sense when applying any pellet – if you're going to get an inch of rain overnight, don't apply until after the event. The slugs aren't going to find them if they're covered in a layer of soil.

"The other thing that I'll raise, and it's a big bug bear of mine, is the insistence that applicators will spread any pellet out to wider distances. You can often walk out into a field and there are strips between tramlines where you can't find a pellet," he warns.

This is because slug pellets vary in their ballistic properties and applicators also have different capabilities in the distances they can spread to. As such, four years ago, Certis Belchim collaborated with SCS Spreader and Sprayer testing to evaluate different applicators with its range of products and subsequently developed the Calibration Wizard online tool.

The tool is designed to help slug pellet applicator operators to quickly and correctly set up their particular machines to ensure molluscicides are applied accurately. Users can enter the pellet product they intend to use along with applicator type, its



Being on the ball more with timing and quality of pellet is important following the loss of metaldehyde, says ProCam's Gareth Williams.

spread width and target application rate.

The Calibration Wizard then recommends disc speed, feed rotor settings and aperture settings, along with the expected baiting point density to take the guesswork out of slug pellet applications.

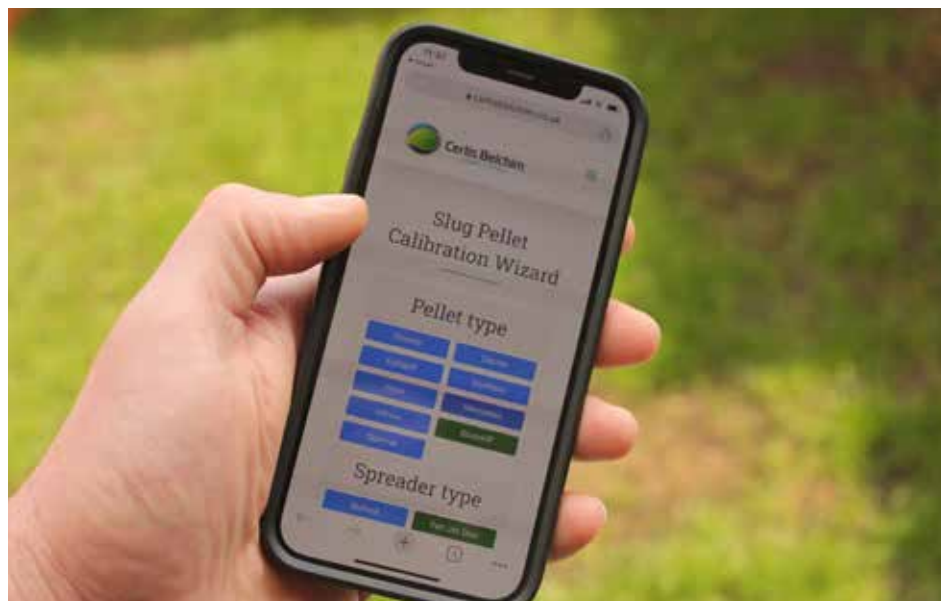
"Operators are able to see how far we back our products to spread using the given applicator, which is based on data we generated with SCS. This should avoid any striping you sometimes see from trying to spread pellets too far," says Certis Belchim's Nathan Whitehouse.

With the right setup, the company's standard pellet Sluxx HP has good ballistic properties for wider spreading with the right applicator - a Stocks FanJet Duo mounted on a sprayer would be one example.

"As you may expect, a mini pellet like Menorex's spread width is slightly less. It just shows how important it is to understand the pellet's ballistics and applicator capabilities to reduce any issues with slug control, particularly in a potentially high-pressure autumn, and the Calibration Wizard helps with that."

David adds that operators should also be mindful of how the max rpm on a spinning disc applicator's motor can slow over time and see a diminished performance when considering spread width. "In any case, getting off the machine after a couple of passes to check spread pattern is important.

"Slug pellets aren't cheap now and they're there to protect the establishment of your crop so should be applied as carefully as any other product to ensure they work as expected," he concludes. ■



The Calibration Wizard is designed to help slug pellet applicator operators to set up their particular machines to ensure molluscicides are applied accurately.



“Rotations aren’t a new concept – but they are the most valuable asset farmers have.”

Responsive rotations

Farming for tomorrow

As growers grapple with trying to balance rotations, a new initiative from Elsoms is claimed to help them do just that. CPM finds out more.

By Charlotte Cunningham

While rotations have always been the mainstay of any arable business, their demands have somewhat changed dramatically over recent years.

Now more than ever, growers are having to juggle environmental challenges as well as political and legislative changes on a frequent basis – all while trying to stay in the green – meaning that thinking about anything more than the current rotation can feel somewhat of a challenge, says ProCam seed manager Lee Harker.

“Rotations aren’t rocket science, but I think the value of the long-term planning of a rotation, which also accommodates change when the circumstances push for it, has become a little forgotten during recent years.”

The importance of the flexibility and

ability of both farmers and rotations to be able to adapt the plan has been heightened this season, and although it’s undoubtedly been a devastating year for some, being able to respond to these challenges where possible can bring benefits, continues Lee.

“If we look at this year, for example, many winter cropping plans changed to spring crops. In a situation like this, if spring crops were sown too late – and therefore likely to result in a later harvest – something like a cover crop might be a more sensible option than trying to push in a spring crop too late, which then compromises successful establishment of the following winter crop.”

Wider benefits

This requires a mindset change too, he continues: “Just because a cover crop isn’t a cash crop doesn’t mean it doesn’t have value and it can bring a wealth of benefits to the soil, which will be advantageous to future rotations. That said, with the current SFI options, there is financial potential there too.”

When it comes to planning and preparing rotations, every farm will have a different ideal formulation and therefore knowing your farm well and working closely with an agronomist is vital, he adds. “Understanding the soils and even individual fields is crucial for when you do

have to respond and change your plan.”

With this in mind, enter Responsive Rotations – a new initiative from Elsoms which aims to support farmers to adapt their time and land to the changing environmental, political and economic landscape to ensure maximum potential for their arable rotations, explains Toby Reich, head of agricultural sales at Elsoms.



Lee Harker fears the value of the long-term planning of a rotation, which also accommodates change when the circumstances push for it, has become a little forgotten during recent years.

So why is it necessary? “Our sector and industry are under pressure – demands from a changing environment, change in policy and changing economy. This all affects profitability right down the supply chain.”

Looking more closely at these pressures, Toby cites climate change, the ban on neonicotinoids, increased weed resistance, the energy price crisis and global grain price volatility as some of the recent challenges, so where do rotations fit in?

“Rotations aren’t a new concept – but they are the most valuable asset farmers have. However, we feel they haven’t been prioritised as much as they could have been during the past decade.”

“So, what we’re aiming to dig into with this new initiative, is how to manipulate rotational planning and unlock the potential within rotations in order to be responsive and react in a positive way.”

In terms of how exactly this new initiative will support farmers, according to Toby, Responsive Rotations is based around combining three key foundations: a data-led approach, cross-crop expertise, and an extensive product portfolio which encompasses everything from typical combinable crops to SFI-suitable mixes.

“Making a successful change to something comes down to having access to three things – the people, the process and the technology to make it happen,” explains Toby.

“Applying this to rotational planning, you have to make sure you have the

right people who have the knowledge and expertise to advise, the process to collect data and disseminate that information to ensure those decisions are scientifically proven, and then the technology to actually affect that change – in this case, varieties with the right traits and resistances to enable farmers to overcome some of the biggest challenges in agriculture at the moment.”

Delving deeper into the technology, any change is going to be founded in breeding, continues Toby. “Breeding is the first point in any new variety or species and therefore it’s down to the breeder to respond to any changes required across the market, which is where we feel we can play an important role.”

Homegrown protein demands

Looking at how they’ve already responded to current challenges, Toby cites bringing soyabeans to UK markets, which are earlier planting and more suitable for UK production, as an example of responding to the changing demand for homegrown protein sources.

In terms of more typical arable crops, he says new winter wheat variety Bamford has been a breakthrough for the company, and Lee adds that it’s a ‘top variety’ which will tick a lot of boxes for growers.

Having varieties which allow growers to be flexible with their plans is vital, says Agrii northern Scotland agronomist Charlie Catto, who has also been impressed with Bamford’s performance. “It does really



Responsive Rotations is a new initiative from Elsoms which aims to support farmers to adapt their time and land to the changing environmental, political and economic landscape to ensure maximum potential for their arable rotations, explains Toby Reich.

well in both the early and later drilling slot – perfect for growers who want to get their crops down early, but also have flexibility if conditions aren’t right. It’s stood up really well despite a very wet year.”

The wet year has also brought additional septoria pressure, however from what he’s seen, Charlie says Bamford has continued to be resilient. “We’ve had a very wet year and septoria pressure has been high. But having seen Bamford in both trials and in seed crops, it’s clear its septoria score is a very strong 6.7 – I would actually say it performs higher than that.”

“Since we lost chlorothalonil (CTL), septoria control has been a challenge. We’ve had new chemistry come into the market, but we’re still not achieving the control we’d like, so have to utilise a variety’s resistance strengths in a way we didn’t have just three or five years ago. To be able to use Bamford like this will support the production of soft wheats across the region while enabling growers to demonstrate good IPM.”

He continues: “The big word at the moment is sustainability – with lots of people looking for a variety where they can afford to target inputs more strategically, but still get the yield and quality, and Bamford ticks all of these boxes.”

“It reminds me of when Skyscraper first came along, and it looks like it could be the new dual-purpose variety.”

Looking at Bamford in more detail, some of its standout characteristics include being the highest untreated Group 3



Climate change, the ban on neonicotinoids, increased weed resistance, the energy price crisis and global grain price volatility are some of the recent challenges faced by growers.

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

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

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► on the market at 92% and outstanding performance where sown as both a first and second wheat, explains Toby. “This is complemented by its strong disease resistance profile and it’s the most marketable variety for the farmer – it can go into feed, it can be distilled, it can go into biscuit making, it’s got the contract for export.”

This has made it popular with growers already, gleaming a 7.4% market share of areas entered in 2024, which is predicted to rise to 15% in 2025.

For those challenged by catchy weather and suboptimal conditions around typical drilling times, Group 4 soft variety Blackstone maintains good performance across a wide weather window, notes Toby. “Its sowing window is from September to mid-February which means it’s responding to that pressure and allowing farmers to have more bites at the cherry when required in terms of getting crops in the ground.”

Other examples of advancements in the breeding programme include more diversity in genetics using the Genius breeding system and hybridisation of crops such as rye to create low input, high output second cereal options, he says.

“Then we take a year like this one, and I also can’t stress enough the importance of having solid winter and spring options,” adds Toby. “If growers find themselves in a scenario where it’s a struggle to get winter crops in the ground again, then they can explore other good options like spring linseed, barley, maize or energy beet.”

But it’s not just about cash crops – cover crops and environmental options are having a resurgence at the moment, largely due to the rollout of the SFI scheme, he points out. “We’ve introduced new species



Nigel Ford believes many growers are still going through a pain barrier with cover crops at the moment, highlighting the need for informed, data-led advice.

and principles through our breeding partners and now supply into the market a selection of both straights and mixtures, needed to meet the environmental seed rules and regulations demand for SFI.”

With more than 30 years’ experience in cover cropping, Nigel Ford from specialist wholesale seed merchant All Things Rural, says to get the best from them, careful planning and management is required. “While some growers have been incorporating cover cropping for a number of years, the reality is, many are being pushed down this route due to a combination of less chemistry available, changing markets and policy forcing them to look at other options. We then have SFI adding to this, it’s a bit like the Wild West at the moment,” laughs Nigel.

“The challenge with this is that in general, we as an industry don’t have that depth of knowledge and experience in terms of what to do, how to do it and when to do it – so many are still going through a pain barrier with cover crops at the moment, highlighting the need for informed, data-led advice.”

This is the beauty of Responsive Rotations, he adds. "It's making growers think about what they're doing and why they're doing it to work towards the outcome they want – and that's the most important thing with cover crops. Getting cover cropping benefits are a long-term game and so it's important to plan and prepare for that."

Toby continues: "We have a team of breeders on hand and available to talk to internally and externally – no one knows these varieties like they do, and it's that knowledge which is going to help growers get the best from their rotations from sowing right through to marketing."

Going forward, while growers are likely to be slightly bruised as Harvest 2024 draws to a close and thoughts turn to next season's crops, Lee says the ethos behind Responsive Rotations

has never been more important.

"We always say anecdotally that farmers farm for last year – so this year everyone is likely to be getting wheat in during September, for example. But I think something like Responsive Rotations will help growers refocus their mindset to look both at the longer-term strategy and be able to make an educated choice if plans have to adjust in response to change throughout the season."

Toby concludes: "It's more than just sowing a crop. Responsive Rotations is all about taking a holistic overview of the whole production system, right way through to marketing, while using the best advice, the latest data and the most cutting-edge breeding to develop sustainable rotations which can truly withstand the challenges of modern-day agriculture." ■



Charlie Catto has been impressed with Bamford's performance and says having varieties which allow growers to be flexible with their plans is vital.

Elsoms' offerings

Elsoms claims it has one of the most extensive portfolios on the market – but what exactly does that include?

The current line up comprises:

- Wheat
- Oilseed rape
- Beans
- Linseed
- Triticale
- Fodder beet
- Cover crops
- Spelt
- Fibre flax
- Barley
- Oats
- Maize
- Peas
- Hemp
- Rye
- Lucerne
- Hemp
- Soya



Looking at how Elsoms has already responded to current challenges, the firm has brought soyabeans to UK markets, which are earlier planting and more suitable for UK production, as an example of responding to the changing demand for homegrown protein sources.

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Making a splash

Insider's View: OSR

Oilseed rape is a crop that's having a hard time but breeders are doing all within their power to create more resilient varieties. Cue DSV's Dolphin, with its high gross output and all-new harvest protection genetics. CPM takes a closer look.

By Melanie Jenkins

Dolphins are known for their high intelligence, diverse hunting skills and airborne acrobatics, but DSV is hoping its latest oilseed rape variety of the same name will be known for its oil content combined with its new powerful pods genetics.

New to AHDB's Recommended List for 2024/25, DSV Dolphin boasts a number of attributes, including a high gross output and good agronomics, but the firm is hoping to bring greater security to OSR growing in light of the increasingly variable growing conditions farmers are facing.

According to DSV's Sarah Hawthorne, the variety is the first of a new generation of hybrid varieties specifically developed to combine a key set of genetic traits which protect against adverse weather conditions later in the season.

"Pod shatter genetics featured in several DSV OSR varieties and others on the RL, have done much to highlight the issue of harvest seed shed. However, it's now widely understood that how a variety performs

during its growth and at harvest is the function of many different characteristics rather than a single gene or property.

"Other factors such as the plant's overall strength and health, its disease resistance and growth habit together with the actual physical form of the pod, are increasingly seen as fundamental to how it performs at harvest."

DSV's breeding team has been working to incorporate a core set of traits within its latest material based around the concept of 'Powerful Pods', says the firm's Alex Doering. "We've now identified three key pod characteristics, which when included in varieties, contribute significantly to reduced seed losses in adverse conditions. These consist of greater flexibility of the pod structure, improved function of the pod valve margins, greater space around individual seeds and longer actual length of pods."

Resilient pods

Pod structure flexibility ensures a resilient 'rattle-proof' form, making pods less friable and better able to absorb the energy experienced from extremely high winds or hail storms, rather than breaking open, he explains. "In addition, the greater flexibility also allows pods to cope better with the uneven tensions produced from drying after rainfall which can result in seed pods splitting.

"The valve margin is the mechanism at the base of the pod which essentially controls the opening of the valves, effectively the sides of the pod containing the seeds. Having a stronger valve margin helps to avoid the early triggering of the opening process which can happen when pods are stressed, such as in adverse

“It's hard to ignore its East/West gross output of 106%, matching all of the top varieties on the RL”

weather or when being combined.”

So how does the final trait of having more space around the individual seeds make a difference? "When seeds have more space in individual pods it allows them to develop fully as they mature so a variety can reach its full yield potential, but it also stops growth stressing the pod which can again lead to premature failure," explains Alex.

In both DSV's own trials and through AHDB analysis of pod shatter, the results have demonstrated Dolphin's performance in this respect, says Sarah. "A trial conducted at DSV's breeding station in Thule, Germany, saw pods from different varieties hit with steel ball bearings to test impact tolerance and Dolphin demonstrated the highest score for seed retention.

"In addition to this, results from 2023 AHDB analysis have also shown little difference in the performance of the variety with regard to seed loss compared with many of the most popular pod shatter varieties," she adds.

United Oilseeds' Beckii Gibbs highlights that Dolphin carries DSV's powerful pods protection traits with inbuilt pod technology providing maximum seed retention at harvest. "Seed loss protection is an extremely important trait to have due to an increased prevalence of heavy showers in and around harvest time. I know from speaking to farmers that it's extremely frustrating to see the pods fill, only for sharp showers or even hail to knock a portion to the ground. Pod shatter gives some insurance against the ever-changing climate and it's something growers are keen to see in their chosen varieties."



According to DSV's Sarah Hawthorne, Dolphin is the first of a new generation of hybrid varieties developed to better cope with adverse weather conditions later in the season.

As well as the variety's pod shatter resistance genetics, it also offers a robust disease package with good scores for light leaf spot, phoma, and resistance to turnip yellows virus (TuYV), says Beckii.

According to Sarah, Dolphin is one of only a few varieties with the Rlm7+ gene, as well as multi gene resistance to phoma. In addition, she flags that the variety has a strong resistance to verticillium, something which is becoming of increasing note to the industry.

"The variety also has some of strongest tolerance to sclerotinia in our portfolio. We know that both of these diseases can result in early senescence which can result in seed loss prior to getting the combine in the field."

But Beckii feels that Dolphin's standout characteristic is its oil content. "This is very high at 46.6%, but that said, it's hard to ignore its East/West gross output of 106% matching all of the top varieties on the RL."

Another of the variety's key attributes is its new leaf development, meaning it grows away extremely well in the spring, she explains. "And as a relatively short variety, at 143cm, it offers good ground cover with excellent standing ability. All-in-all, it's a reliable, simple to



Due to how the Dolphin has performed in trials so far, United Oilseeds' Beckii Gibbs believes it's naturally suited to those in the East/West regions.

grow variety that should do well."

However, with it being new, Beckii feels it's hard to say if there are any drawbacks just yet. "From what's been observed in DSV trials, the variety is seen as reliable and simple to grow offering practical traits which help a grower at harvest. The disease package seems to cover all bases, so at this stage, I can't see anything to fault."

Due to how the variety has performed in trials so far, Beckii believes it's naturally suited to those in the East/West regions. "While it seems a suitable variety for any grower with a

Going swimmingly

Andrew Davies has grown Dolphin for the first time this season at Court House Farm near Wormsley. Despite having almost given up on growing OSR entirely, he's been pleased with how it's grown so far.

With hybrid varieties preferred due to deer and pheasant issues, and on the recommendation of others, Andrew planted around 7ha of Dolphin on 22 August 2023 using a Sumo Trio combination cultivator with a Sumo drill on the rear.

"The variety was very quick to establish and was up and

away in no time," he says. "I've had the worst year ever for cabbage stem flea beetle but Dolphin is doing fine as it was planted in a field on top of a hill that didn't suffer as badly."

Andrew took a conservative approach with inputs but noticed that Dolphin grew a lot more vigorously than another variety, which was in the same field. "It looked good through winter and I should be combining it very soon. I'd ideally like it to yield 4.3t/ha, and if it does, I might put it in two fields for the 2024/25 season."



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DSV's breeding team has been working to incorporate a core set of traits within its latest material based around the concept of 'Powerful Pods'.

- ▶ good all-around package, given that it's bred to be simple to grow, it may be that it's particularly suited to those who've had a break from OSR or potential new growers." As far as where Dolphin could fit on farm and the varieties it could work well alongside, she thinks with its strong spring vigour and potential for a later sowing date, she'd be tempted to spread risk by having an earlier drilled variety alongside Dolphin. "Likewise, I'd perhaps look at some of the other traits and see what I could plant to complement it opting for something like Attica, a strong hybrid that has proven on-

Dolphin at a glance

Gross output (% treated controls)	
UK treated	105.3
East/West region	105.7
North region treated	[102]
Oil content, fungicide treated (%)	46.6
Agronomics	
Resistance to lodging	[8]
Stem stiffness	8.5
Earliness of flowering	6.1
Earliness of maturity	6.6
Pod shatter resistance	-
Disease resistance	
Light leaf spot	5.8
Phoma stem canker	6.7
Verticillium	[Moderately resistant]
TuYV	R

Source: AHDB Recommended List, winter oilseed rape 2024/25. [] = limited data.

farm performance with pod shatter in-built."

With all of its attributes in mind, what sort of potential marketability does Dolphin have? "The proof is usually in

the pudding and the statistics in trials suggest Dolphin will do well," says Beckii. "But there are a number of good new varieties vying for a spot this year." ■

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Winter Linseed

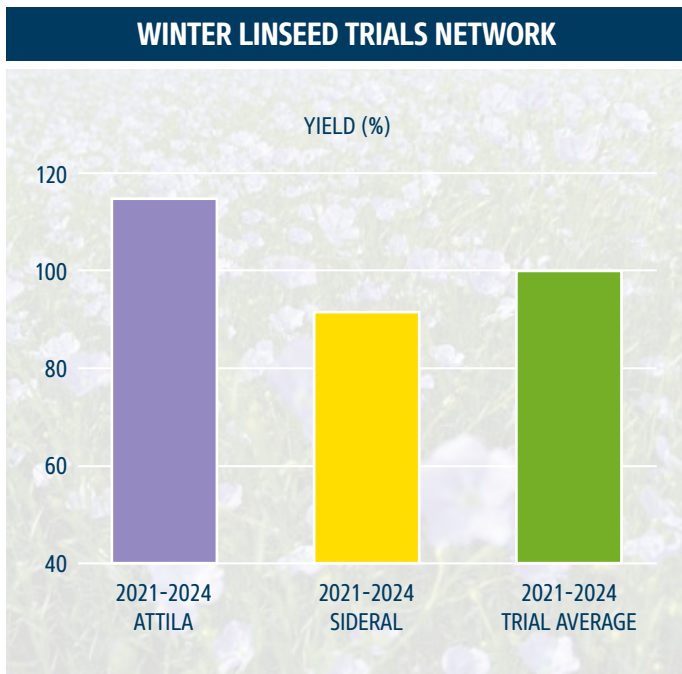
Attila's reign continues

Battle-tested in a wide range of conditions, read a snippet of Scottish Agronomy's Managing Director Adam Christie's review of Winter Linseed:

"We have proven that the crop can be grown successfully in Scottish conditions with little in the way of winter kill and yields now consistently over 3 tonnes per hectare".

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“We believe we’ve reached a point where winter linseed could now be a viable option for certain growers across the UK.”

Winter linseed trials

Survival of the fittest

Trials suggest that when managed correctly, winter linseed has the potential to thrive even in Scotland’s challenging climate, achieving some of the highest trial yields in Europe. CPM reviews the findings.

By Janine Adamson

Even as growers struggle to make the financials for oilseed rape stack up, alternative break crops have a lot to prove when it comes to changing mindsets. And in the case of winter linseed, a challenge has always been proving its winter hardiness, says Premium Crops’ Nigel Padbury.

As a result, the company has been working with Scottish Agronomy to deliver seven years of trials which aim to debunk myths associated with the crop and its ability to survive the winter. “Historically, winter linseed has been perceived as too delicate to overcome the challenging Scottish climate, with doubts even among breeders as to whether it could cope with the harsh weather.

“With a drive to find alternative break crop options, Premium Crops commissioned a series of trials with a stringent ‘hardiness’ screen in place to

identify viable varieties. During the years, persistence has paid off, demonstrating that lines such as Linea Semences’ Alpaga can perform,” says Nigel.

“Now, today’s trials use the latest Linea Semences variety, Attila, which has in fact thrived in the Scottish climate, achieving the highest yields across all of our winter linseed trials.”

Cinderella crop

However, it hasn’t always been plain sailing and as a result, Scottish Agronomy’s Adam Christie says he wasn’t full of confidence when the trials began seven years ago. “In some ways, winter linseed is a Cinderella crop – back in the mid-90s when we discovered we could grow it if conditions permitted, there wasn’t the required investment from breeders so yields would be a rather modest 1t/ha. There’s also a common perception that harvest is challenging to say the least.

“We were approached by Premium Crops to run the trials at Coaltown of Balgonie as a means of exposing varieties to the extreme. Of course in the first instance, this meant going back to the basics of crop management to understand if we could make linseed a compelling option,” he explains.

Adam says during the first years of the trials, the importance of drilling date soon became apparent. “In Scotland, this is around the end of August through to early September. Equally, you can’t underestimate the importance of herbicide use because linseed has an open canopy in the autumn therefore

isn’t competitive with weeds.

“Gaining the EAMU for metazachlor at pre-emergence has helped in this respect because herbicide options are especially limited in minor crops,” he adds.

By year three, the team was starting to note some success and agronomic guidelines were being formed. This included finding an alternative desiccation solution following the loss of diquat, which was solved by adjusting the management of glyphosate.

“Despite the challenges, we’ve raised yields to 3.2t/ha, which makes our winter linseed trials some of the highest yielding in Europe. We believe this means we’ve reached a point where linseed could now be a viable option for certain growers across the UK,” says Adam.



Premium Crops’ Nigel Padbury says the company commissioned a series of linseed trials with a stringent ‘hardiness’ screen in place.



The conditions conventionally experienced in Scotland are becoming prevalent UK-wide, as demonstrated by this past season, says Scottish Agronomy's Adam Christie.

Additionally, there's consistency in the trial results, with yields having exceeded 3t/ha for three years running. But what is it about Scotland that means it can produce impressive yields for both winter linseed and OSR alike? According to research, it's all down to the cooler climate delaying flowering until daylength is longer.

Then once flowering has completed, pod development takes place which also coincides with longer days thus providing higher yields.

"This does mean of course, that OSR remains a viable crop in Scotland, with some growers achieving upwards of 5t/ha," suggests Adam. "But for others averaging 3.5t/ha due to the challenges of cabbage stem flea beetle, clubroot or wider disease pressures, linseed should be a viable and less risky option.

"I think it's time to try something new, especially in parts of England. Equally, we recognise that due to climate change, the situation in Scotland may soon change – we're seeing tangible climate shifts all within our lifetime," he adds.

Furthermore, he believes there's much value to be had from Scottish trial data. "The conditions we conventionally experience in Scotland are becoming prevalent UK-wide, you only have to take this past season as an example."

Nigel recognises Scottish OSR growers don't experience the same level of CSFB pressure as their English counterparts, but highlights that the break crop conundrum is a problem shared by all. "There are simply few options out there so winter linseed is an opportunity, particularly when OSR is yielding below the Scottish five-year average of 4t/ha.

Piqued interest

Seeing the trials at Scottish Agronomy this year has been enough to convince independent agronomist Hamish Coutts of the benefits of winter linseed, he says.

Hamish, an Association of Independent Crop Consultants (AICC) member, recalls the negativity surrounding spring linseed in the mid-90s and its subsequent fall by the wayside. "Now, varieties have improved considerably plus Scottish winters don't seem to be as severe, so it's become viable," he says.

"The benefits of winter linseed had already piqued my interest, but the trials really caught my attention – I was blown away by the breadth of varieties now available."

Benefits-wise, Hamish believes there are two main points to consider – winter linseed offers an alternative break crop, and, it requires relatively low inputs.

"You can't deny that conventional break crops such as potatoes or carrots and their associated cultivations, are damaging soils. As we progress towards more sustainable approaches, we'll have to be more conscious about our cropping choices.

"In a similar vein, winter linseed



Hamish Coutts says the benefits of winter linseed had already piqued his interest, but the Scottish Agronomy trials really caught his attention.

requires lower inputs than other crops which is beneficial from not only a cost of production perspective, but is also better for the environment," he explains.

Although winter linseed's profile is currently quite low, Hamish says he'll be introducing the crop to his customers, who span across East Perthshire and Northeast Fife. "I hope more people take an interest, it certainly deserves more buy-in," he concludes.

Sowing flexibility

"There are also wider benefits of the crop – winter linseed isn't susceptible to CSFB at all and the window for sowing can be much wider, depending on location and conditions. Compared directly with OSR, winter linseed has half the nitrogen requirements yet has a similar harvest date, so doesn't impact the wider rotation," he explains.

With evidence growing in linseed's favour, does Nigel anticipate any bumps in the road to success? "Virtually all UK linseed goes into the animal feed market due to its omega-3 levels, and as such, we can't grow enough to meet demand.

"But as with any controlled market, it's easy to flood it so it's important to carefully manage supply and demand," he says. "Randomised growing won't achieve that – growers have to seek a contract and be assured their crop has a home. There's also evidence that pricing is better for contract crops compared with spot trading."

At the time of publication (August 2024) winter linseed was trading at around £460/t. Furthermore, Premium Crops has established contract value options with either a minimum price of

£450/t, or, a variable price linked to the OSR market. Nigel says this establishes a fair and predictable income for the grower while allowing planning of future crop seasons with surety of sale price.

However, on balance, Adam believes it'll likely take time for the benefits of winter linseed to truly catch on. "I think it'll be a slow burner – the next stage will be identifying the exact varieties and maximising their output.

"Importantly, it adds another tool to the armoury and is potentially a good news story for the industry. In the meantime, the trials we're running in Scotland are collating a catalogue of research which will be invaluable in the future," he suggests.

Finally, have the trials helped Adam to quash preconceptions around harvesting linseed? "On the whole, during the seven years of trials, we've managed to harvest the linseed okay. Conditions have to be sunny and breezy; being fully ripe is key to avoid blockages.

"If harvest continues as it has, this may prove a challenge this year, but does that make it more risky than OSR for some growers? Understanding the nuances of harvest is critical for any minor crop," he concludes. ■



“Regardless of the type of cover crop establishment is key, there’s not much point doing it if it doesn’t achieve its purpose or true potential.”

Biostimulating cover crops

Biostimulants

Could including a biostimulant seed treatment when sowing cover crops be the key to better establishment and increased soil health gains? *CPM* accesses the latest trial results to find out more.

By *Janine Adamson and Rob Jones*

Biostimulants and cover crops – the benefits of the two in isolation are widely publicised and as a result, their use is now commonplace across many UK farms. But what happens when they’re combined together? Furthermore, could this approach help growers in the North to improve cover crop establishment?

Pondering this concept led to ProCam running an experiment at its trial site at Stockbridge Technology Centre at Cawood in North Yorkshire, working with a seed treatment biostimulant from Unium Bioscience.

However, an initial hurdle had to be overcome – understanding how to apply a biostimulant to the cover crop seed in the first place. “We’ve traditionally worked with liquid-based seed treatment biostimulants which although very positive, do have some logistical limitations,” says Unium’s Andrew Cromie.

“They’re mostly designed to go through

conventional seed treatment systems such as those which dress cereal seed. But some crops such as maize arrive pre-bagged, or in the case of grass, treated seed can clump which is problematic later on,” he explains.

Taking inspiration from the USA and its use of graphite, Unium realised there was greater potential to use the technology for UK-based applications.

Dry lubricant

“In the USA, they often use graphite as a dry lubricant within precision systems but we wanted to know if it could be used as a new means of integrating a biostimulant in a seed treatment formulation instead,” adds Andrew.

Similar to rubbings from pencil lead, graphite is a charged fine powder which forms a slick, film-like coating to seed which enhances flow without clumping. Having undertaken a series of viability trials, Unium has identified a suitable formulation in the guise of Elios-GT.

According to Andrew, the product is a metabolite-graphite complex which as per most biostimulant seed treatments, maximises seed germination, establishment and seedling vigour. What makes Elios-GT different is due to the graphite component, it can be used across a wide range of crops including cereals, maize, pulses, oilseed rape, cover crops and vegetables.

In terms of application to the seed, it’s been coined a ‘salt and shake’ method – a sachet of Elios-GT is added to a bag of seed and shaken. This, plus the vibration from a drill when sowing, allows the graphite to create the even coverage required.

It was this innovation which caught the attention of the ProCam trials team, coupled with a desire to mitigate the challenges associated with establishing

cover crops, which have become increasingly popular since the launch of the Sustainable Farming Incentive (SFI).

Trials manager, Becky Tunnicliffe, devised a protocol to gain a deeper understanding of Elios-GT’s performance and its potential. “This involved three different cover crop mixes which are designed to meet the NUM3 (legume fallow) SFI action, sown at two drilling dates (19 April and 7 May), with and without Elios-GT. A second aspect of the trial explored different establishment cultivation methods.

“From experience, we know that early planting of a cover crop can be less favourable in terms of establishment, but if successful, can provide more time for the plants to flower and is therefore more likely to meet the aims of SFI actions. By using a biostimulant, we hope we can



According to Andrew Cromie, graphite is often used in the USA as a dry lubricant within precision systems but Unium realised its wider potential.



Using Elios-GT to accelerate cover crop establishment can equate to gaining up to a fortnight on drilling date, says ProCam's Becky Tunnicliffe.



In the trial there was a measurable difference in the April-drilled Elios-GT-treated plots (shown right) from cotyledon stage through until stem extension.

overcome this challenge and improve biomass and ground cover," she says.

With this year's unfavourable spring conditions, Becky points out that 19 April was the earliest possible opportunity to drill the plots and where possible, planting would have taken place earlier. Equally, with cold, wet weather continuing throughout spring, the 7 May plots were only sown once soils were warm and moist, however struggled to flower until much later than anticipated.

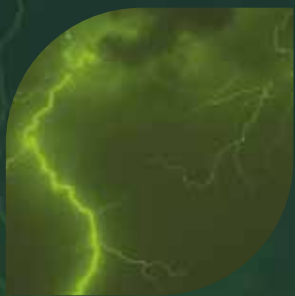
Despite these challenges, the cover crops treated with Elios-GT showed a marked difference, even to the naked eye, she reveals.

"You could particularly see an improvement in the early vigour and ground cover of the buckwheat. As for sowing date, there was a measurable difference in the April-drilled Elios-GT-treated plots from cotyledon stage right

through until stem extension, from a biomass perspective (see tables).

"Anecdotally speaking, there also appeared to be more flowers which means the plots could offer more to pollinators," adds Becky.

As for cultivation method, the trial suggests this depends on what's being planted. "When the cover crop was drilled, a greater breadth of species established



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Early emergence is a critical stage for weed suppression and if this isn't managed correctly, it can be difficult for a cover crop to overcome the subsequent competition, says ProCam's Josh Baker.

% Ground cover by date						
Drilled 19 April	30 April	13 May	17 May	20 May	28 May	05 June
Mix 1	0.5	10	30	30	60	80
Mix 1 + Elios GT	0.5	15	25	30	60	80
Mix 2	2	20	50	60	75	85
Mix 2 + Elios GT	3	25	60	60	75	85
Mix 3	0	3	7	10	15	20
Mix 3 + Elios GT	0	7	20	25	40	50



Anecdotally speaking, with Elios-GT (shown right) there appeared to be more flowers which would offer more to pollinators.

► successfully compared with when the seed was broadcast due to improved seed-to-soil contact. In fact, the buckwheat pretty much failed in this instance.

"We've also seen variation in the success rates of the different mixes as a whole – mixtures with more species diversity have established better, achieving good levels of biomass by June. Whereas a less diverse mix with a high proportion of buckwheat and vetch, haven't done so well," she says.

So what does Becky believe this means? "Using Elios-GT to accelerate establishment can equate to gaining up to a fortnight on drilling date, which is particularly helpful in the North where soils take longer to warm up. This year at Stockbridge was the perfect demonstration of that – really tough conditions and cold, wet soils – so Elios-GT impressed even more.

"With longer in the ground, the cover crops then have a greater chance of delivering the environmental gains and meeting the aims of the appropriate SFI action. With these NUM3 mixes this meant the provision of food for pollinators, improving soil health and suppressing grassweeds," she suggests.

"Beyond that, the trial indicates the importance of treating a cover crop with the same attention to detail as a conventional

break crop, not cutting corners with establishment method, and using other tools to ensure good survival and rapid growth when conditions are sub-optimal."

North Yorkshire agronomist Josh Baker believes as well as meeting SFI criteria, biostimulating cover crops has the potential to deliver much more. "With improved biomass comes better soil cover which means less erosion and increased organic matter – just some of the original aims behind using cover crops in the first place.

"There's also the concept of weed suppression – part of the guidance for several SFI actions including NUM3 legume fallow and AHL1 pollen and nectar mix, is that herbicides can't be used once the cover crop is established meaning a full canopy is the only way to manage the weed seed-bank," he points out.

Although recent positive news has reinstated the rotational aspect of NUM3, the crop is expected to be in the ground long enough to meet the aims of the action. With that in mind, considering weed

burden and the risk associated with poor suppression is critical. Reducing cover crop seed rates or opting for more cost-effective mix options might reduce initial seed costs, but could incur greater spend with herbicides later in the rotation."

Furthermore, he says early emergence is a critical stage for weed suppression and if this isn't managed correctly, it can be difficult for a cover crop to overcome the subsequent competition. "Therefore it's encouraging to see how Elios-GT boosts emergence, particularly in the challenging conditions we experience in the North," adds Josh.

"Having now seen the trials, it's definitely something I'm keen to try in the field. Regardless of the type of cover crop, establishment is key, there's not much point doing it if it doesn't achieve its purpose or true potential."

A final benefit Josh highlights is the fact Elios-GT is a separate seed treatment which the grower can apply themselves, without a tie to specific mixes. "Equally, undertaking a separate pass through a cover crop, such as to apply a liquid biostimulant or fertiliser, is both dependent on field conditions as well as weighing up the associated machinery costs.

"Being the graphite formulation makes for a convenient and appealing delivery mechanism," he concludes. ■

Cover crop mixture	Species (>5%)
Mix 1	Balansa clover, berseem clover, crimson clover, common vetch, linseed, buckwheat, phacelia
Mix 2	Berseem clover, crimson clover, lupin, linseed, buckwheat, phacelia
Mix 3	Common vetch, linseed, buckwheat

Benefits from an integrated approach

An ongoing multi-site trial programme is producing a roadmap for how biosolutions can be used to deliver the most effective results. The work, conducted by Agrii, suggests integrating biosolutions into conventional agronomy programmes can boost both disease control and crop margins, with timings and product combinations having a major effect on their performance.

While in some cases, when used alone, biosolutions can offer a similar control to moderate fungicide approaches, integrating within reduced programmes can produce the same results as full strength conventional treatments, suggests Agrii's Jodie Littleford.

"It's time to take biosolutions seriously; there are fewer new active ingredients coming to the market and all are facing tougher regulatory hurdles," she says. "Then, there's the fact that across the food supply chain, pressure is growing for greater sustainability and lower carbon footprints of production, with reductions in synthetic inputs seen as a key contributor.

"But we know biological solutions don't perform in the same way as traditional

chemistry, so it's critical we understand how to best target their use."

Not all biosolutions are created equal, she says, and it's wrong to group them together as universally effective and beneficial. "Equally misleading is perceiving them as direct replacements for conventional chemistry, product for product, with the most powerful gains observed when both are able to complement each other and create synergy.

"Furthermore, we have clear evidence that using biosolutions early in the programme, before disease takes hold, is where they're most effective," she continues.

Future promise

"Weather conditions during the past two seasons have highlighted just how difficult future disease control might be, but this also provides insight into the promise biosolutions hold. With changing climatic conditions, there's an even greater desire to focus on crop resilience and stress mitigation," says Jodie.

No two seasons are the same and there's no such thing as a 'normal' season anymore, she ▶



Where biosolutions are used early and before disease levels escalate there's a sustained reduction in septoria levels through the season, even compared with full four-spray fungicide programmes, suggests Agrii's Jodie Littleford.

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Benefits from an integrated approach continued

► adds. “We’ve had two years characterised by high levels of disease pressure at the beginning of the season, for example. While last year stalled later on, this year disease levels have progressed right the way through.”

For this season, many experienced a wet period during autumn planting which has meant a wide array of drilling windows with sub-optimal establishment in both early and later drilled crops, she explains.

“The spring continued with wet weather driving septoria levels in crops and again there were few windows for early applications resulting in a curative situation. Wet, mild conditions have been maintained meaning a sustained high disease pressure year and even without gaps in programmes, normal level fungicide programmes have struggled.

“In fact, it’s been a perfect introductory year for two new active ingredients – Iblon (isoflucypram) and Adepidyn (pydiflumetofen) – offering potentially better disease control levels.”

Equally, maintenance of green leaf area has been even more critical in contributing to yield generation, so its likely returns from crop protection spend this year are going to be significant, suggests Jodie.

As a result, some approaches have stood out from others. “Products related to building crop resilience, like elicitors which boost a plant’s hyper sensitive response, have shown particularly positive results, especially used alongside the right supportive elements.

“Generally, these products work best when they’re applied ahead of disease, similar to a flu vaccine. We’re essentially giving the plant everything it requires to better prepare and initiate an immune response for when the pathogen does eventually arrive,” she explains.

“Effectiveness largely depends on when disease starts cycling in the crop, but this isn’t necessarily a new concept if we consider current practices around protective applications of fungicides.”

Agrii has also seen encouraging trends from the use of amino acids. “These building blocks are utilised across a number of biochemical functions including protein synthesis, stress reduction and modulating stomatal opening. Biostimulation of these processes can enhance growth, nutrient cycling, help crops combat disease and improve productivity,” she adds.

Growth promoting compounds such as PGA (pyroglutamic acid) and phosphite have also impressed. “These enhance nutrient utilisation and efficiency, which improves rooting as well as upregulating photosynthesis



Integrating biosolutions within reduced fungicide programmes can produce the same results as full strength conventional treatments, suggests the trial. Left: Agrii standard 4-spray fungicide programme. Right: Agrii bio approach T0 and T1 followed by Agrii standard fungicides at T2 and T3.

which in turn provides the plant with more energy and resources to thrive,” says Jodie.

Trial protocol

With all of this in mind, to date, the Agrii programme trials have adopted three levels of application – a full biological approach, a 50% reduction in synthetic inputs, and then a fully integrated approach supported with a robust fungicide programme.

According to Jodie, these have been tested alongside more traditional approaches using different levels of fungicide input, with a range of encouraging responses.

“Where we use biosolutions earlier in the programme and before disease levels escalate we see a sustained reduction in septoria levels right through the season, even compared with full four-spray fungicide programmes.

“Where this pattern starts to break down is when septoria levels have already started to build in the early stages of the spring so the effects of the biosolutions on crop resilience are potentially limited.

“In terms of yield and margin, all three approaches have generally been equivalent, if not better, than our standard fungicide programmes which indicates how much biosolutions can contribute to crop performance success.”

In trials this current season, similar trends have emerged, even under the heightened and sustained disease pressure of the 2024 season, highlights Jodie.

“Early septoria scores in one trial found much lower levels when using elicitors versus standard chemistry. Other trials visited in July 2024 in South Wales, where septoria pressure has been extreme, showed plots treated with a standard fungicide programme with virtually no green leaf area remaining.

“But plots in the same trial with a fully biological approach at T0 and T1 had significantly more green leaf area remaining on the flag leaf. So even in a year such as this, biosolutions are stacking up against traditional chemistry when used in the right way within a programmed approach,” she says.

So far, all trials have been field-based, but new developments at Agrii’s Throws Farm in Essex will allow mode of action and integration of biosolutions to be looked at in much more detail. The construction of a large environment-controlled glasshouse will facilitate the removal of external ‘noise’ such as weather, variable growing conditions and pests, from future trials.

According to Jodie, this means focusing specifically on what the biosolutions actually provide while improving the management of aspects such as spray timings and crop nutrition.

“That should provide a more accurate picture of what the biosolutions are contributing and what the best combinations with other crop inputs are. All told, our objective is to cut through the claims and instead hone-in on what the real grower benefits are and how these can be replicated on farm,” she concludes.



“Lamport is all about getting the seedbank down to enable sustainable approaches such as direct drilling and improving soil health.”

Maintaining a balance

Lamport AgX

It's back to Lamport for Agrovista's flagship AgX event, during a year when balancing environmental stewardship with weed control is more topical than ever, plus the added temptation of drilling early. *CPM* visits the site for this year's update.

By Janine Adamson

Having banked 11 years of research on how growers with high blackgrass sites can produce profitable September-sown first wheats while delivering on environmental best practice, it's arguable that Agrovista's AgX site at Lamport in Northamptonshire couldn't be more relevant.

After all, experts are predicting a higher than average seed return following poor autumn weed control, and as the weather continues to be highly unpredictable, growers will be questioning whether it's worth holding out for drilling and risking a repeat performance of last year.

At Lamport, the system centres around growing first wheats in years one and four of a cropping rotation, explains Mark Hemmant. Then through 30 individual plots, the team evaluates the success of different traditional and novel spring crops, cover crops and some of the actions currently available through the

Sustainable Farming Incentive (SFI).

Although Mark stresses that to achieve results such as those at Lamport it involves a long-term complete systems approach, he says much of the work focuses on the role of spring cropping and autumn cover crops. "On heavy soils with a high weed seed-bank, this means minimising soil movement when planting a cash crop – something we learned during the early years of Lamport.

"We've found that small seeds aren't reliable when direct drilled in the spring at this site, so we have to work with crops such as beans or spring cereals, in fact spring cereals have always performed well," he explains. "And now, not only do the autumn cover crops offer soil health benefits, but they can attract an SFI payment too."

Rotation management

To simplify the many options being explored at Lamport, Mark says it's about understanding what to grow between winter cereal crops to enable earlier drilling while maintaining blackgrass control and avoiding issues such as take-all.

For Agrovista, the conclusion mostly lies in spring beans and oats. "We've found that if you can control weeds effectively, spring beans are a really good entry crop for winter wheat. Whereas the oats, although not a true take-all break, will deliver providing the straw and excess residue are removed."

But an option which has caught Mark's attention during recent years is companion planting spring wheat with a low count of beans (10 seeds/m²). The reason being, it could help to mitigate take-all, while upping the profitability of the rotation. "Companion planting also improves soil health and adds diversity, plus there's the associated SFI payment for this action," he adds.

"However at Lamport, oilseed rape – which is often companion planted – is an unreliable entry for winter wheat because due to cabbage stem flea beetle damage, crops can be patchy and therefore allow blackgrass to grow through."

Something which he hadn't anticipated would become a problem, is the use of flower strips between crop plots. Although great for nurturing pollinators, beneficials and biodiversity, Mark says the flower species have been a source of grassweeds and the flowers themselves have slowly crept into the plots. "In the case of this site, because we're trying to minimise our herbicide use, we've had to take the flower strips out."

So what about the whole-field options currently available through SFI? Hamish Wardrop, national rural consultancy manager, says Lamport has been exploring options such as winter bird food (AHL2) and legume fallow (NUM3/CNUM3), to understand



The Lamport system centres around growing first wheats in years one and four of a cropping rotation, explains Agrovista's Mark Hemmant.

► their impact on blackgrass control.

“Owing to extremely high blackgrass pressure, we’ve since had to destroy both the winter bird food and legume fallow. On this particular site, the winter bird food doesn’t work because we can’t take that level of blackgrass through the season.

“In a commercial situation, you’d re-drill and start again which of course has cost implications. You have to go in with your eyes open that there’s a trade-off; you can’t lose sight of what you’re trying to achieve with the cash crops,” he explains.

Mark agrees: “Lampton is all about getting the seedbank down to enable sustainable approaches such as direct drilling and improving soil health.”

On a more positive note, the team feels there are many benefits to be had from a spring-sown cover crop. “It was drilled in mid-April comprising phacelia, buckwheat, crimson clover, wild carrot and oxeye daisy. Admittedly perhaps a little over the top but under the 2024 SFI offer aims, it meets the requirements of a spring cover crop,” says Hamish.

“There’s a level of blackgrass, but we believe we can live with it because the cover will be destroyed around harvest time and then go into an autumn cover crop followed by a spring cereal. If we can retain the blackgrass seed on the surface and use the autumn cover as a trap crop,



Although great for nurturing pollinators, beneficials and biodiversity, flower strips have proven a source of grassweeds and the flowers themselves have slowly crept into the plots.

we should maintain grassweed control.

“It’s a lovely mix, has encouraged a lot of pollinators and has clearly done the job environmentally-speaking,” he comments.

Another option showing promise at Lampton is low-input harvest cereal crop (AHW10), available through the expanded 2024 SFI offer. Mark says this can be stacked with a cover crop payment and achieved by growing oats for example, with an under-sown wildflower mix.

“For this, we’ve seen a low level of blackgrass and believe it has the potential to deliver in terms of margin. It could be a positive all-rounder,” he suggests.

Recognising the importance of an integrated approach to weed management,

work continues at Lampton to evaluate the best herbicides to use when direct drilling. The ongoing trial looks at different levels of soil disturbance with and without Avadex (tri-allate), plus different herbicide treatments (aclonifen and cinmethylin).

Whereas in previous seasons there have been clear front-runners, this year, Mark says aclonifen and cinmethylin have performed similarly. “In a dry autumn we found aclonifen performed better but it’s not so clear cut this time.

“In a high grassweed scenario, we believe the best control can be achieved through using both actives and the Avadex, with the cinmethylin at peri- or early-post-emergence,” he concludes. ■

Cup tyre compaction project

A new feature at Lampton AgX this year is comparing the large footprint, low-inflation Galileo AgriCup tractor tyres with conventional VF tyres. The aim is to understand how to reduce soil compaction in spring crops while also testing the new technology.

The tyre is part of Galileo’s CupWheel range (as featured in *CPM* August 2023) which the firm says offers superior performance through an innovative concave sidewall and an elongated footprint that functions like a track. The structure also allows for high radial flexibility, ensuring a uniformly distributed, extended footprint even under extreme loads.

For the trial at Lampton, half of the plot, which follows an overwinter cover crop, was direct drilled with combining peas with the other half being direct drilled spring wheat. Assessments were made for the compaction effect on soil, seed depth and drilling performance when using a tractor shod with either Galileo or VF tyres. Wheat yields will also be noted at harvest.

The VF tyres ran at either 18psi or 10/11psi, with the latter being the lowest to safely

accommodate a Weaving GD drill and a full seed hopper. In comparison, the Galileo AgriCup tyres were set at an inflation pressure of 6psi.

Independent cultivations expert, Philip Wright, has been overseeing the trial. “As a benchmark, we’ve assessed both the untrafficked centre of the crop plot as well as the wheeling for each tyre pressure or type.

“During crop emergence, aside from the centre of the plots, the low pressure VF has performed marginally the best followed by the Galileo AgriCup, and I believe the same can be said for now. The 18psi VF tyre has undoubtedly performed the worst in terms of effect on the seeding zone, and resulting crop emergence and growth,” he explained.

With the Galileo tyres being middle of the road, so to speak, Philip was asked if he believes there’s a valid market for this type of technology. “I believe the biggest opportunity lies in skid-steer loaders or gantry, linear or central pivot irrigation systems for a start.

“In the UK, if you had a cultivation or establishment system that uses a lot of



During compaction trials at Lampton, cultivations expert Philip Wright says low pressure VF tyres performed marginally the best followed by the Galileo AgriCup.

rear-mounted kit, then you may also see a benefit. However, there’ll have to be a wider range of tyre sizes to improve the accessibility as this current limitation led to higher than optimal slip due to a compromised lead ratio for these trials,” he concludes.



nature matters

by Martin Lines

Harvesting new opportunities

It's been a busy summer of conferences, shows and events across the country and I've had conversations with many different farmers. It's become increasingly obvious that they fall into two distinct camps – those who are up for a journey of change, moving to regenerative approaches and engaging with government schemes, and those who are still in the mindset of 'produce as much food as possible – climate and environmental outcomes aren't my concern'.

For some there's almost a head-in-the-sand attitude. 'We're not causing any problems and haven't done so in the past either'. I believe some farmers are unaware of what's rapidly approaching and the changes that'll have to be made to meet legal requirements and market demands in the near future. The old saying of 'standing still means you're going backwards in business' has never been truer, and many farmers will soon find the regulation stick tapping them on the back, or access to the market being denied.

Things are changing – producers and retailers are starting to address the legally binding targets and reporting. One major reason companies are now taking an interest in nature-friendly farming is their environmental,

social and governance (ESG) commitments. In particular, recording scope-3 emissions makes them accountable for the carbon emissions impact of their broader supply chains.

Many of our major supply chain customers are making commitments to purchase partly or solely from regenerative systems in the very near future. We've seen new products such as the Wildfarmed regenerative bread come to major UK supermarkets, for example. The potential impact on market access and consumer recognition is significant; any farmer who isn't taking steps towards a regenerative system may rapidly find their market access being reduced.

For many of us, the majority of the grain we produce gets lost in the system and we're not directly accountable. We've seen the failed attempt by Red Tractor to launch its Green Tractor scheme, which was created to facilitate the market demand for recording data. This was a nice idea, but instead of hiding behind another scheme that implies farmers may or may not want to take this up at some point, the government has to make it clear that all farms are going to have to undertake carbon auditing and understand the biodiversity baseline on their farms.

We should be recognised by the marketplace and the consumer for our work that's above and beyond getting our own businesses to net zero. We farmers have the power to make some of the most significant changes to the condition of our landscape if given the right support.

However, planning cropping rotations is becoming increasingly complicated. We're juggling to keep up

to date with who pays the most for which outcome in the various scheme options, what public and private finance is available, and the market conditions. More SFI options have been released ready to be stacked on top of existing options used by our businesses, and new rewards and payments from the private market are becoming available.

It's increasingly difficult to keep track of everything and ensure we aren't missing out on opportunities. Many of the actions public money is supporting at the moment will soon become business as usual and the funding will disappear, so it really is a case of making the most of what's available now to support our businesses and the environmental crises.

We often hear the term 'public money for public goods' used to refer to the changing priorities for government, shifting away from area-based payments to Environmental Land Management schemes. However, several recent reports, including the National Audit Office's review of the Farming and Countryside Programme, show the wide gap between what the government is currently paying for and getting poor value for, and the cost of what is actually required to deliver in the farmed landscape.

The private sector is increasingly eager to help farmers manage their land and businesses more regeneratively and reward our steps towards reducing emissions pollution and supporting nature recovery, not just our yields.

If we're to thrive during and beyond this transition, we must understand the Environmental Improvement Plan (EIP). Our new government aims to

rapidly review the EIP, which contains significant, legally binding targets. Many of these targets mean substantial changes to farming businesses to meet air quality, water quality and environmental improvement goals. It may not be the most exciting reading, but it's well worth empowering yourself with the knowledge of its impacts on many of our businesses.

To take one example, some of the products we currently use will come under increased pressure, particularly urea fertilisers – which can affect air quality in our town and cities. Understanding and preparing for these changes will ensure we're well-equipped to navigate the future of farming.

Change can be daunting, confusing, and challenging. But what if we looked at this as an opportunity? With increasing numbers of organisations and influential individuals providing funding, knowledge exchange, and support, harvesting these new opportunities for funding and learning new practices could mean we farmers lead the way on regenerative, nutritious food production and landscape-scale nature recovery at the same time.

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

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“ We’ll continue to work to improve our soils and become less reliant on artificial inputs. ”

Sustainable Solutions

Widening the crop rotation has been a vital tool for one farm manager in his drive to make the land both more productive and sustainable. CPM speaks to him to dig into the details.

By Melanie Jenkins

Becoming farm manager will always be a sizeable task, but doing so on a farm at one of the largest estates in Britain with the aim of turning the focus of the business around entirely, is a different challenge altogether.

But Chris Lovie has embraced this with both hands to drive sustainability at Dunecht Home Farms, which is part of Dunecht Estates in the North East of Scotland. Chris manages 6000ha in total, with 700ha of cropping grown around Dunecht, consisting of a mix of wheat, spring barley, winter barley, oats and oilseed rape, as well a running 100 cows and 300 ewes on the low ground and 2500 ewes on hill ground.

When he took on the management of the farm in March 2019, there were a number of challenges to overcome to improve cropping, sustainability, soil health and the commercial potential of the cash crops.

A wider viewpoint

One such challenge was that cropping had been kept in a very tight crop rotation under the previous management. To widen the rotation, Chris has shifted from a 3-4 year cycle to up to eight years with cereal crops. “The rotation was just too tight so we’ve increased the arable area on the farm by taking out grass,” he explains.

By broadening the rotation, this has allowed him to expand the hectareage of OSR he’s growing while using winter barley as an entry to it. Although the farm doesn’t have a significant problem with cabbage stem flea beetle, the pest was present in OSR in 2022, but luckily the weather usually kills it off when it does appear, says Chris.

Break crops

Winter oats are also now grown as a break crop for winter wheat to help extend the rotation. “We grow 200ha of wheat and it just wasn’t possible to maintain this with a short rotation,” he adds. “As well as being able to grow the crops we want to, we’re finding crops are now a lot cleaner with fewer weeds that are easier to control, disease pressure is much lower and soil structure has improved.”

When Chris joined the farm there was a significant issue with sterile brome that he’s since worked to get on top of with the help of Charlie Catto, Agrii agronomist. Before Charlie came on board, the same fields were used for the same three-year rotation – with spring crops cycling with grass in some and others always planted

with winter wheat, winter barley and OSR. This meant there was never a break.

Farm-saved seed was used but brome seed wasn’t removed, leading it to multiply across the farm, explains Charlie. “The herbicide programme being used wasn’t really tackling the brome, instead it was aimed at annual meadow grass.”

Widening the rotation and moving fields into a mix of winter and spring cropping helped to tackle this, he explains. ▶



Farm manager, Chris Lovie has embraced the task of driving sustainability at Dunecht Home Farms.



Winter oats are also now grown as a break crop for winter wheat to help extend the rotation.

► “We also bought new seed which was brome free and looked at using different cultivations such as ploughing deeper and not reinverting at the headlands, as well as using herbicides based on flufenacet and Avadex Factor (tri-allate). It’s been a combination of integrated pest management and agronomy to achieve control of the weed.”

A further benefit of widening the rotation and shifting between winter and spring cropping in all fields has surfaced in the form of increased organic matter and better crops, he says.

However, one approach that remains set on farm is the use of the plough, despite attempts to venture into minimum tillage. “Compactions was pretty bad on

the farm with headlands set like concrete. We’ve removed a lot of the pans and the compaction issues through different cultivations which has helped to bring up the yield average,” explains Charlie.

But when trialling min-till the drop in yield was too significant to justify continuing with this approach, says Chris. “We now tailor our approach to the situation, for example we have a Simba cultivator with a deep leg that’s useful on headlands, but a Horsch Pronto DC is the main drill. The ground can be quite wet in the winter so we have to be careful how we broach the soil structure as it has to have a good north-east wind to dry out.”

Chris has utilised green manure cover crops to help open up soil structure, add in organic matter and as a good entry for wheat. These are supported through government schemes – something the business had in place before Chris joined, but which he’s further tailored to suit the farm by directing them at less fertile ground.

iFarm trials

Dunecht Home Farms is in its first year of being an Agrii iFarm, but the business has been involved in trials with the company previously in a bid to fine-tune its approach and look at options for integrating the farm’s diverse operations.

“You can look at results from trials carried out on a farm just 30 miles away, but that’s no indication the same practices will work in your own situation,” suggests farm manager, Chris Lovie. “The beauty of being an iFarm is we can see the latest ideas so can hopefully keep ahead of the game, but also so we can establish what will deliver benefits here and what won’t.

“Moving forward, we’re particularly interested in ideas that can work across the arable and livestock enterprises to help us to establish a more sustainable base for the future.”

One such example has been the business’ trials with different cover crops, which are now entering their third winter, he says. “Spring barley tends to be harvested a bit later in the North East of Scotland, often into September and there are a lot of trials and tribulations with that so we have to plant cover crops which can handle the late sowing. But if we can work out a way of doing this, we’ll be right at the forefront and there are a lot of potential benefits.”

Agrii agronomist Charlie Catto agrees, saying the trials are focused on identifying

mixtures that will grow and work when later drilled while comparing the performance for the following spring barley in both minimum tillage and ploughing scenarios.

“We’re measuring subsequent crop yield but also nutrients, particularly nitrogen, phosphate and potash, that are fixed by the cover crop. The idea is that we can establish something in the autumn that’s going to give us a good green mass and which will also work well with the farm’s sheep – lambs can come down off the high ground and graze the green cover crop in the spring.

“We can also reduce fertiliser inputs off the back of this which can lead to some potential end market benefits. Distillers are looking to reduce their scope-3 emissions, so if we can demonstrate we’re using reduced inputs but getting similar yields, and also being more sustainable through using cover crops, then in the long run Chris and Dunecht are going to achieve a higher premium for their grain.

“It’s a good example of trying to work all of the systems together – improving the soil structure, using the cover crop for the high ground sheep, and then trying to achieve a better end market for the grain.”

Other opportunities being looked at in the new iFarm initiative are using nitrification inhibitors to drive greater nitrogen use efficiency (NUE) and making more cost-effective use of phosphate, he says. “We’re



Other opportunities being looked at in the iFarm are using nitrification inhibitors to drive greater NUE and making more cost-effective use of phosphate, says Agrii’s Charlie Catto.

using Liqui-Safe with the farm’s liquid fertiliser approach, so when the temperature warms up later in the season, or there are wet spells, the risk of greater nitrification and volatilisation can be reduced. This should allow us to reduce nitrogen use by around 10% while cutting out on a pass of the sprayer. Again, it’s another way of trying to be more sustainable while using our nitrogen more effectively.

“The use of Agrii Start Release is also being explored to make more use of the available phosphate. Phosphate levels are high at the moment so we want to see if we can make this more available to plants without making further applications. Hopefully, we’ll be able to draw some of that phosphate back out of the soil and into the crop.”



One approach that remains set on farm is the use of the plough, despite attempts to venture into minimum tillage.

Soil sampling

Turning his attention to further improving soil health, Chris has adopted a practice of regular sampling to look at pH, phosphate, potash, magnesium and organic carbon levels. “This is something we’re constantly trying to improve and so have created soil maps and are soil sampling as well as applying lime every five years to ensure the target pH of 6.5 is met and never falls below 6.”

He also uses soil and tissue analysis to determine where macro- and micronutrients should be applied to best benefit crops, such as magnesium, sulphur, manganese, zinc, boron and copper.

The loamy soils on the farm have a high stone content but also have a high level of organic matter, ranging between 5-7%. “The farm has had constant applications of muck during the years, and I’ve stopped selling straw straight off the back of the combine and either arrange straw for muck deals or I chop it. I’ve also introduced the use of digestate to the farm to try and constantly improve organic matter.”

A notable improvement that Charlie’s observed where muck or digestate have been applied is when the farm has a really dry or an extremely wet summer, with these areas coping much better. “This has improved both the durability of the soil and the crops.”

A further change Chris has



Sterile brome had become rife on the farm due to the use of farm-saved seed and split spring and winter crop rotations.

implemented has involved moving to liquid fertiliser to improve application. “We’re now applying a lot less P and K and when we combination drill, the rates of fertiliser used have almost halved compared with what they were previously because of our soil indexes. But going forward I’d like to bring in variable nitrogen and seed rates to achieve the best out of what we’re applying.”

In the long term, Chris feels some uncertainty around the subsidy outlook in Scotland, which doesn’t have the Sustainable Farming Incentive (SFI). “Until we hear a clearer message from the Scottish Government, we’ll continue to work to improve our soils and become less reliant on artificial inputs.” ■

Sustainable Solutions

The leading agronomy development network

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

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

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

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

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



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

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





What can wee do?

Alternative fertiliser

Self-sufficiency is a broader issue than just the food grown and consumed within the UK, extending to all other inputs including fertiliser. *CPM* explores a novel approach which converts urine to a domestically produced fertiliser to close the sustainability loop.

By *Melanie Jenkins*

Agriculture may be familiar with the practice of applying biosolids as fertiliser, but what about urine? It could come as a surprise to some, but using urine as a fertiliser is by no means a new or innovative practice – it's one firmly lodged in the annals of time – but is now being reborn.

It's a by-product of endless uses that have been enacted for millennia. Astronauts recycle it to reclaim water, the Egyptians used it to diagnose diabetes, Assyrian-Babylonian's could determine pregnancy through it and the Romans used it to fertilise their gardens.

A long-standing practice was to tan animal skins with urine and several-well known (but unprintable in *CPM*) British idioms were born from the families who

were so poor they had to sell their waste this way.

According to the National Institute of Health, each human creates about 1.7litres of urine a day which equates to around 621litres per year. Multiplied by the UK population of 70M, this is in the region of 43.5Bn litres of urine, with the majority of this collected by water companies and made safe for release into public waterways. As a result, there's huge potential for the nutrients present in urine, such as nitrogen and phosphates, to be utilised as fertiliser.

Turning the tide

But now, a consortium of organisations is looking to bring the fallen-from-favour practice of using urine as a fertiliser to UK farmers. "The concept of urine as a fertiliser has been around forever, civilisations have been using it for a long time, but it became less favourable with the large-scale manufacturing of synthetic fertilisers," explains Green Square Agro Consulting's Mike Lee.

The consortium, consisting of NPK Recovery, the Royal Agricultural University, Peequal, UK Agri-tech Centres, Pilio and Green Square Agro Consulting, have united with funding from Innovate UK and the Co-Op Carbon Innovation Fund to develop a urine fertiliser that's safe to use on farms as an alternative to inorganic inputs.

Although applied rates of nitrogen, phosphorous and potassium on UK farms are falling (Agricultural Industries

Federation 2023), there are concerns around fluctuating costs and the carbon impact of artificial fertiliser, which are aspects the consortium hopes to address.

"The project is targeted at providing an alternative sustainable source of fertiliser, recovering nutrients such as nitrogen and phosphorus from urine. Traditional nitrogen fertilisers rely on the Haber Bosch method, an energy intensive process reliant on natural gas, while phosphate fertilisers are produced from fast diminishing sources of mined phosphorus, from areas such as the Saharan region of North Africa," explains Mike. "The interesting thing is, we have an opportunity to maintain fertility in farming

but potentially lower the carbon impact simultaneously, by using a readily available substance. Net zero shouldn't automatically mean a fall in productivity because there are different and innovative ways of doing things."

This is something the consortium is still working to ascertain, as it'll require further research before

it's able to determine whether capturing phosphates this way will consume less carbon than importing mined phosphates from North Africa, he adds.

Although the project is still in the development stage, some aspects have already begun to take shape, such as through Peequal which has designed a chemical-free female urinal that's being used at events, including at the London Marathon and Brighton Pride. There's also a laboratory set up and a head office in Bristol, and in the coming months, the fertiliser will be trialled on crops at the University of the West of England and the Royal Agricultural University, where

“ We have an opportunity to maintain fertility in farming but potentially lower the carbon impact simultaneously. ”



A consortium of organisations is looking to bring the fallen-from-favour practice of using urine as a fertiliser to UK farmers

yield and nutrient uptake will be key measures of success, explains Mike.

But how will the urine be collected, especially as so often there are 'extra' elements disposed of in the process? "We're just collecting urine from staff in the office at the moment and are working on wider-scale modelling," explains Mike. "Obviously, Peequal has designed its female urinal, but we're also exploring the options of collecting waste from stadiums, motorway services and festivals because this way urine can be captured in its raw, chemical-free, state. But we do have to flesh out the logistics of how it'll be collected and distributed."

The idea with the project is to collect urine locally and install a facility either on-farm or accessible to multiple farms within a set area, where the waste product is then transported to, treated and converted to a useable fertiliser. "The idea is that this'll be produced on a farm-based scale rather than through a large fertiliser manufacturer."

One of the challenges the consortium is still working to overcome is how to prevent unwanted elements making their way into the collected urine, but Mike highlights that this doesn't happen in the volume or frequency that might be expected. "And the team at the University of the West of England testing the urine for any pharmaceuticals and pathogens. However, processes such as long term storage or UV treatment create a sterile product and a study carried out by the University of Hohenheim in Stuttgart, found products made from human urine 'are viable and safe nitrogen fertilisers' and 'didn't show any risk regarding transmission of pathogens or pharmaceuticals'."

So how is it processed? Mike explains that they precipitate out the solids into struvite, which is effectively the equivalent of kidney stones, but this doesn't prevent the fertiliser from being



The project is targeted at reducing the amount of imported, synthetic fertiliser, especially because phosphate is currently mined in the Saharan region of North Africa.

produced in either a solid or a liquid form. And given the increasing switch to liquid fertiliser, he envisages that the product will likely come in liquid form because creating a solid requires more energy as it has to be de-watered.

"There are also benefits of accuracy when using liquid fertiliser and although we've seen a far wider adoption of this method in the US and Canada, it's gaining more traction here."

Compatibility

According to Mike, the urine fertiliser will be functional with existing equipment and machinery already on farm, so that users wouldn't have to purchase new kit to coincide with its adoption. "And so far as the accessibility of nutrients in the urine fertiliser by plants goes, this should be similar to that of inorganic inputs because it has significant values of nitrogen, phosphorous and potassium, with as much as 20-22% phosphate, making it similar to a triple super phosphate (TSP) product.

"We're researching where a urine fertiliser would fit into systems agronomically and believe it would work well in an organic system, but the use of biosolids isn't favoured by organic organisations, so we're not sure

if there will be take-up from that area.

"However, the product has the potential to feed soil biology, helping to improve soil health and therefore could work well in regen systems because this fits with the concept of taking a natural product, refining and stabilising it, and then using it as part of a healthy farm system."

The other factor the consortium will address is cost, because this can make or break a product's adoption potential. "We're currently focused on refining the process, but we understand cost will have to be comparative with current fertiliser options," explains Mike.

"But from a practical perspective, we saw enormous spikes in inorganic fertiliser prices a few years ago and macro-economics continue to be influenced by the geo-political turmoil, making us very aware of how fragile the supply chain really is. So from a strategic point of view, creating a system whereby the UK's producing its own fertiliser resource just makes sense."

One area which could require further definition is legislation, given that biosolids, due to their origin from human sewage, can only be applied to crops destined for animal feed and not human consumption. "I don't believe there's any prohibitive legislation in place apart from the standard fertiliser and crop production code of practice that applies to biosolids, but this is another area we'll be looking for definition on. However, I don't see there being any issues with urine fertiliser being used on commodity crops being produced for livestock feed. And the US, France, Switzerland and Sweden are all using urine-based fertilisers.

"Although urine fertiliser is unlikely to completely replace applied urea, especially for those growers wishing to achieve 10t/ha wheat crops, it still has the potential to play a part in reducing emissions, feeding the soil and perhaps reducing the amount of inorganic fertiliser applied," concludes Mike. ■



Given the increasing switch to liquid fertiliser, the product will likely come in liquid form because creating a solid requires more energy as it has to be de-watered.



“ There’s a considerable difference between sowing a plant community and a random collection of seeds. ”

Wildflower meadows

Meadows matter

The introduction of SFI has created a surge of interest in implementing actions which aim to promote biodiversity through habitat creation. But does simply ticking a box deliver enough? CPM investigates what’s possible when inspiration is taken from nature.

By Janine Adamson

It’s difficult to fathom that wildflower meadows are one of the rarest habitats in the UK, in fact, 98% have been lost since the 1930s. But why care about British wildflowers and should the responsibility of their restoration fall at the feet of farmers?

The introduction of the Sustainable Farming Incentive (SFI) would suggest the government believes so, despite acknowledgement that the development of land for property is also at fault. This is because ultimately, a decline in wildflowers means a reduction in pollinators and insects that underpin many other ecosystems, which has a very

tangible impact on food production.

Furthermore, if pollinators such as bees disappear so do the animals that eat insects including birds, hedgehogs and bats, and that’s before even considering the visual negative impact on the country’s rural landscapes.

But does the answer truly lie in SFI, which financially rewards farmers for implementing management practices that aim to protect and benefit the environment? Wildlife farming consultant, Marek Nowakowski, questions whether the onus on quantity rather than quality is the correct approach.

On a journey

“We should compare the parameters of SFI with what nature has been doing since the dawn of time and ask, are we doing the best that we can? Environmentally, we’ve come a long way during the past few years but it’s clear far more can be done.

“Science from the UK Centre for Ecology and Hydrology (UKCEH) tells us that cheap, poor-quality habitats don’t deliver the expected biodiversity increases aimed at boosting farmland wildlife,” he stresses.

According to Marek, farmers should be paid more for proven, higher standards of delivery. “Years ago, the payment by results experiment showed what farmers could really do when paid to deliver, so why has the bar been set so low by government?” he asks.

“I’m also concerned by the decision to replace rules with aims – we all require

rules – although guidance has since been modified to include the word ‘must’.

“Additionally, habitat quality and variety are key to an increase in biodiversity, but it all requires appropriate management. Ultimately, habitats are ‘crops’ so should be ‘farmed’ – by this I mean active management and adequate knowledge are essential.”

Marek highlights that many flower mixes



Science suggests cheap, poor-quality habitats don’t deliver the expected biodiversity increases aimed at boosting farmland wildlife, says wildlife consultant, Marek Nowakowski. Pictured with companion, Spot.

targeted at SFI aren't linked to soil type or a specific delivery, with most comprising 80% grasses and 20% flowers. The less expensive mixes can contain flowers from short-lived agricultural cultivars which on fertile arable soils, promote rapid vegetative growth and poor species diversity.

Instead, better results can be achieved from reducing the grass percentage and using native flowering species although it's unlikely this will be cheap, he says.

"It's important to remember there's a considerable difference between sowing a plant community and a random collection of seeds. But equally, there's a lot to creating an appropriate habitat; for something worthwhile, it can cost around £500-700/ha.

"These quality mixes take time to deliver – far longer than three years – but done well, they have a long life expectancy. We should aim to take inspiration from nature, which has provided habitats which stand the test of time, and copy those."

This was the approach adopted by Andrew Ingram at Greenfield Farm in Watlington, Oxfordshire, a self-confessed nature enthusiast. Although primarily in the business of Christmas tree growing, the farm also rotates between winter



Many flower mixes targeted at SFI aren't linked to soil type or a specific delivery, with most comprising 80% grasses and 20% flowers.

wheat, cover crops and game cover.

It was after seeing Marek walking around a wildflower meadow as part of a television programme in the 1990s that Andrew felt inspired to begin habitat restoration. "I asked Marek to visit and it soon became clear that we spoke the same language, so we embarked on our voyage in 1996 and started by enrolling

in an environment scheme," he says.

For 10 years under Higher Level Stewardship (HLS), Andrew looked after 16ha of meadows (assigning the least productive agricultural land at the farm) as well as planting woodland, hedgerows, field margins and introducing barn owl boxes. Then in 2006, the farm, which is mostly on thin chalk soils, entered a

Mix options

Understanding the desired outcome and choosing a seed mix accordingly is the key to making biodiversity stack up, is the message from technical advisor, Hannah Clarke.

Hannah, from Kings Crops, part of Frontier Agriculture, explains that despite there being a broad range of price points available, in reality, there are two main mixes which the company recommends. "At the lower end, there are 1kg packs of wildflowers and agricultural legumes aimed at small-scale projects, or to add to existing grass swards.

"We then have two recommended mixes for establishing IPM2 for SFI – the flower rich grass mix and the enhanced flower rich grass mix. The difference between the two being that the enhanced contains twice the wildflower percentage," she says.

At the other end of the spectrum is the most premium wildflower option from Kings Crops – the IPM flower mix. "This aims to attract specific predatory insects including ladybirds, solitary bees and lacewings and is becoming popular in high value systems such as vineyards.

"But practically speaking, the flower rich grass mixes will fit most scenarios, although these can be tailored to include region-specific

wildflowers or to accommodate certain soil types such as heavier clays," suggests Hannah.

She agrees with the viewpoint of quality habitats requiring investment, but also acknowledges that for larger hectarages within conventional systems, the more cost-effective options still have a role.

"SFI payments are becoming increasingly desirable and we have to understand that for some, these mixes aren't going to last that long and are being used as a rotational tool. That means it's important to be pragmatic with flower-rich options such as IPM2 or AB8 and choose them when the desired outcome is to create long-term habitats.

"So in some instances, particularly those three year lifespans, winter bird food (ALH2/CALH2) and legume fallow (NUM3/CNUM3) are likely to be better choices," explains Hannah.

Having spent the summer at events and speaking to farmers about SFI, she says she's observed an overall attitude shift towards IPM. "We're definitely undergoing a mindset change and with that comes new learning.

"A critical element is taking advice regarding the establishment of the different actions, particularly IPM2 and AB8. Consider the location – can you access it regularly to



It's important to be pragmatic with flower-rich options such as IPM2 or AB8 and choose them when the desired outcome is to create long-term habitats, says Kings Crops' Hannah Clarke.

cut it? Flower-rich options require time for management because good weed control is vital for the survival of perennial species.

"They are long-term projects, so for many embarking on their SFI journey, it may be more of a gradual process," she concludes.

Details of the different mixes available can be viewed at www.kingscrops.co.uk/wildflowers



Quality mixes take time to deliver but done well, have a long life expectancy.

► Mid-Tier scheme and expanded the area of flower meadows to around 40ha.

As a result, one of the wildflower meadows at Greenfield Farm is approaching 30 years old, which Andrew says has proven a source of great enjoyment during that time. “We went in with a basic mix of 26 species, six of which were grasses, but selected specifically for chalk grassland. We’ve now recorded more than 120 different species including five different orchids that now call the meadow home.”

Since then, he’s purposefully added new flowering species aimed at specific insects. “Although we had to intervene with proactive management early doors, it’s reached an equilibrium now with little intervention. Perhaps we’re fortunate that the site is a perfect location surrounded by woodland, but we’ve done our bit and nature has repaid us handsomely.”

An example of Andrew’s tailored approach has been the introduction of horseshoe vetch (*Hippocrepis comosa*) – a perennial plant which is essential for chalkhill blue butterflies because their caterpillars feed solely on it. And of course, the overall result has been a hike in insects and wildlife – the farm has started moth trapping for UKCEH and has so far recorded 32 different species.

Marek believes Andrew’s meadows are a showcase of what can be possible with a nature-first mindset. “The fact unusual species are thriving proves the value of the whole thing;



Horseshoe vetch (*Hippocrepis comosa*) is a perennial plant which is essential for chalkhill blue butterflies because their caterpillars feed solely on it.

Andrew has always gone above and beyond what’s necessary,” he says.

Andrew admits that stewardship grants haven’t covered the cost of establishing his meadows, but instead he’s used the money to subsidise the journey he wanted to pursue. “I’d never go there with these new three-year options,” he adds.

But what of the management that both Andrew and Marek promote? At a basic level, it begins with understanding exactly what’s in the mix, suggests Marek. “In terms of golden rules, flower seed depth is critical – broadcast the seed don’t drill it, then, ensure you’re sowing at the correct time of year.”

Managing growth

“Repeated cutting in year one is required to manage growth, reduce weed burden and to allow light to penetrate the canopy,” he says. “That’s why it’s also important to carefully consider seed choice selecting between native and agricultural species. Whereas native seed is more expensive and slower growing, it lasts longer. Agricultural species may be cheaper, but they’re bred for yield and are therefore dominant and shorter lived.”

As for habitat lifespan, some SFI mixes may cost around £125/ha but are designed to only meet the criteria of SFI agreements. In comparison, a balanced plant community for quality habitat delivery will cost more than £500/ha, but has the potential to thrive beyond 10 years. Marek hopes this provides food for thought in regard to the economics of achieving environmental good.

“It’s worth comparing all the costs

of cheap repeated sowings to a single quality, long-lived sowing and that’s before we compare the different environmental deliverables.”

Equally, by combining a thriving wildflower meadow with other tactics such as well-managed hedgerows, he believes it’s perfectly achievable to fill the ‘hunger gap’ wildlife often experience and therefore break the chain of decline.

But Marek stresses that he doesn’t blame farmers for the direction of travel with SFI, far from it. For one, he says there’s a distinct lack of training on the benefits of optimal habitat management. “No one wakes up simply knowing all of this, myself included. There has to be a greater focus on providing farmer-appropriate education across the board.”

In fact, Marek is actively involved with Agrii – which now trains all agronomists accordingly so appropriate advice can be given to farming customers.

He also flags that the Office For Environmental Protection could evaluate environmental delivery which may result in SFI funding model changes and greater governance. “This is concerning, but payment by results would reward delivery and therefore yield a better outcome for the public purse, nature and the biodiversity we’re trying to protect.

“Additionally, there’s no denying there’s a lot of enjoyment and pleasure to be taken from a more considered approach. I don’t think I’ve ever met a farmer who isn’t remotely interested in wildlife and nature,” he concludes. ■



By combining a wildflower meadow with other tactics such as well-managed hedgerows, Marek Nowakowski believes it’s achievable to fill the ‘hunger gap’ wildlife often experience.



“ We can literally watch the difference to the soil which comes from investing in it. ”

Soil Farmer of the Year

Soil superstars

Following this year's Groundswell event, *CPM* caught up with 2024's Soil Farmer of the Year to find out how they're making the most of the ground below.

By Charlotte Cunningham

Although soil is often coined as a farmer's greatest asset, there are some going above and beyond to protect and rejuvenate this brown gold...

This includes David Newman and Tracy Russell, who claimed the coveted title of this year's Soil Farmer of the Year at the recent Groundswell event.

David and Tracy operate a market garden business – Bucksum – at Shabbington Fields Farm in Buckinghamshire and have been beating the drum about how prioritising soil health can provide real tangible benefits for a farm business since its inception in 2006.

Delving deeper into the workings of Bucksum, the business was founded initially on the premise of growing baby leaf salad, explains David. “At the time, baby leaf salad had just started to appear in the supermarkets and I was disappointed with the quality and price, so I started experimenting with growing my own and selling it at farmers markets.

“This slowly grew and we started to incorporate different mixes, which meant we went from one small polytunnel to

where we are today – growing about 40 different crops, seasonally.”

Almost 20 years later, the operation now sits across 6.5ha with around 1.6ha cropped each year. It works on a four-year rotation taking a cash crop every fourth year, with the other three years spent regenerating the soil, explains David. “The area is divided into eight 0.4ha plots. Two of those are cropped each year and the other six are put into what we call a fertility building phase.”

Herbal leys

In practice, this means that following a cash crop plot being harvested, a herbal ley is established which remains in situ for three years. The mix is from Cotswold Seeds and includes deep rooting species such as cocksfoot and chicory, as well as ryegrass, trefoil and clovers. “We've tailored the mix so it doesn't include things like brassicas as we don't want to perpetuate any soil-borne issues which could occur with us growing brassicas in the cash crop years.”

In terms of management, during the past three years the pair have been grazing the cover crops with another local farmer's sheep – the Chilton Grounds Farm flock. “As well as providing a cost-effective way of managing the herbal leys, the soil also benefits from the manure which helps further build organic matter levels and soil health,” notes David.

More recently, they've also been experimenting with establishing living mulches in the cash crops to double up on both a saleable crop and building soil health in the same year, adds David, and he's also looking to experiment

with strip tillage to minimise movement of the soil when establishing the cash crops. In terms of crop protection, minimal chemistry is used and instead companion plants like catmint are used to ward off issues such as flea beetle.

The plots are divided by lines of agroforestry fruit trees, which as well as bringing more biodiversity also creates a useful natural windbreak, explains David. “Each line comprises about 120 fruit trees – mainly apples and pears, but some stone fruit too.”

Now in the fourth year of incorporating the trees, David says though it's worked well, there are challenges with managing the trees so that they don't become too overgrown, and also controlling the weeds. “To overcome this, we started using chickens to clear the ground. Their house is moved along the tree line on a daily basis and we've found that they're brilliant for controlling both pests and keeping down the weeds which otherwise could



David Newman and Tracy Russell claimed the coveted title of this year's Soil Farmer of the Year at the recent Groundswell event.



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During the past three years the pair have been grazing the cover crops with another local farmer's sheep – the Chilton Grounds Farm flock.

you end up with a product that's usable in about six months," explains Tracy. "It's taken years of experimenting to figure out what works best in the soil improver and we've made mistakes. Once, we bought in some council composted material which resulted in bringing in all sorts of weeds and problems – it was awful, and we never did it again."

In terms of marketing, the duo have formed relationships with chefs – including celebrity chefs Tom Kerridge and Raymond Blanc – and have opened their own farm shop where the bulk of produce is sold through. They also work with other local producers to expand the shop's offering to include soft and stone fruit. "We have a lot of very regular customers," says Tracy. "We're open two half days a week and it's not uncommon for people to come on both days."



The business has grown from one small polytunnel to where they are today – growing about 40 different crops, seasonally.

Bucksum biodiversity

As well as investing in the soil, both David and Tracy are huge advocates for promoting wider biodiversity across the farm. As such, they've established BeeKind natural beehives in the corners of the farm. "These are designed to encourage wild bee populations, rather than hives for harvesting honey. The bees can essentially choose if they want to live in the hive or not," explains David.

"As well as this, we've sown an acre of wildflowers to help the bees thrive when they're in flower. To keep this area as a wild plot the 'hay' generated has to be removed. So to keep things as regenerative as possible, we'll then use these bales as windbreaks."

Another important initiative the pair have undertaken is planting three sequential plots of phacelia, designed to flower in turn to provide continual food for bees and other pollinating insects, as well as helping to increase soil fertility. "What's more, Bucksum's reservoir collects water for watering the crops and is a thriving hub for local wildlife," concludes David. "We're certainly enjoying reaping the rewards of farming in this way."

"The shop is embedded in the local community and because people trust us, they're always willing to try something new. It's all about having conversations about what's seasonal and how eating seasonal produce can help significantly reduce the environmental impact of food production. For example, people have stopped asking for broccoli all-year-round."

While their business is focused mainly on salad production, the learnings regarding soil health are something that larger scale arable farmers can use too. "Keeping soils covered – and roots in the soil – is key, as well as cultivating as minimally as you can get away with," says David. "But most importantly, go and look at other people's farms, join webinars and use social media to find out what other growers are doing. Farming is about continual learning and it's always worth giving something new a go."

"On a large scale, market gardening is seen as one of the most damaging types of farming but it doesn't have to be. At the scale we are, we can literally watch the difference to the soil which comes from investing in it. There are so many benefits, both economically and environmentally, of improving soils and nurturing nature." ■

▶ overrun and outcompete the trees."

Tracy adds: "It's amazing to see just how effective they are; they're also really useful for controlling field voles which are a problem for fruit trees."

Green waste soil improver

In the polytunnels, David and Tracy are also producing their own soil improver. "This is made via green waste from the growing system including tomatoes and sweet potatoes, which are composted with spent hops from a local brewery and woodchips. This is then fed back into the system to keep our soils healthy by building microorganism levels. We're really focused on managing our soils more naturally and in keeping with how they would have been traditionally looked after, rather than having to rely on artificial inputs."

It's a long game, though, with the woodchip having to be stored for 6-12 months beforehand to avoid it taking up nitrogen to break itself down in the compost. "If you start that breaking down process before it's added to the compost

Soil Farmer of the Year

Launched in 2015, the Soil Farmer of the Year competition is jointly run by Farm Carbon Toolkit and Innovation for Agriculture and aims to seek out and champion farmers who are passionate about safeguarding soils and building resilience.

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Drills

Autumn drilling season has come back around with many hoping for a kinder term ahead. But whatever the weather decides to do, having the right drill for the job is as important as ever. *CPM* examines some of the latest products on offer.

By *Melanie Jenkins*
and *Rob Jones*

As the demands on modern seed drills increase, manufacturers are constantly evolving to meet these requirements whether growers opt to direct drill or use power-harrow combination drills, plus everything in between. Here's a selection of the latest machines to hit the market as well as some hands-on experiences from across the UK.

Amazone

As of spring 2024, Amazone celebrated 75 years of seed drill production. The latest additions to its stables include a new Precea trailed precision air seeder in

6m working width and a Cataya Special EcoLine harrow-mounted seed drill.

The new Precea 6000-TCC 6m complements the high-performance capabilities of the 9m and 12m models shown at last year's Agritechnica. A key feature of the Precea 6000-TCC is the option of either the Central Seed Supply delivery system or with individual seed hoppers on each sowing unit.

In addition, the firm offers both variants with a large single-chamber fertiliser hopper with a capacity of 3000 litres together with a central fertiliser metering system. The eight rows can be set to row widths of 70cm, 75cm and 80cm; row widths of 45cm and 50cm based on 12 rows will also be available in the future.

The new Cataya Special EcoLine rounds off the lower end of the Cataya harrow-mounted seed drill product range from Amazone.

The Cataya 3000 comes in a predetermined specification but still aims to offer high performance and reliability in this segment. The harrow-mounted seed drill has a working width of 3m and features a 650-litre seed hopper with a large opening for quick and loss-free filling.

The 24 maintenance-free, RoTeC single disc coulters, with a row spacing of 12.5cm, are designed for precise seed placement.

The Control 10 depth guidance disc or the Control 25 depth guidance roller prevent the soil from sticking to the sowing disc to maintain the pre-selected sowing depth.

The Exact harrow is supplied as standard and provides even seed coverage and blockage-free operation when mulch sowing with large amounts of straw.

The AmaLog+ in-cab terminal aids the driver in changing the tramline rhythm. Other functions include field and total area hectare meters, fill level control and speed monitoring of the mechanical drive. ▶



A key feature of Amazone's Precea 6000-TCC is the option of either the Central Seed Supply delivery system or individual seed hoppers on each sowing unit.

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► Dale Drills

Dale Drills' Mounted Tine Drill (MTD) now offers a split tank feature enabling the simultaneous sowing of two different seeds or products. Equipped with narrow coulters, the tines blend the two products as they penetrate the soil. The 1500-litre hopper, divided evenly, integrates two Accord seed metering units, managed through an RDS Isocan control system.

Available in working widths ranging from 3-8m with row spacing options of 12.5cm, 16.6cm, 18.75cm, 20cm, or 25cm, the MTD aims to address the growing demand among farmers to diversify their seeding methods.

"We've observed an uptick in farmers seeking to incorporate multiple seeds or products with the drill. This split hopper feature, a novelty for mounted tine drills, provides farmers with considerable versatility at a competitive price point," says the firm's James Dale.

Additionally, the firm's Eco Drill range has undergone enhancements. Among the upgrades is a rubber semi-pneumatic press wheel, specially designed for customers utilising the 25cm row spacing configuration. This press wheel compacts soil around the seed utilising its flexible rubber material and scraper to prevent soil adherence.

Moreover, farmers can now optimise soil coverage with the incorporation of a pair of Guttler rings affixed to a tandem axle. These redistribute soil over the seeded row, compacting it around the seed to help improve growth conditions.



Dale Drills' Mounted Tine Drill (MTD) now offers a split tank feature enabling simultaneous sowing of two different seeds or products.

Grange

This year's Cereals Event saw Grange Machinery enter the drill market for the first time with its Tine-Drill Toolbar (TDT).

"The changes in weather patterns during the past five years have affected the traditional end of harvest and drilling seasons drastically. So in our opinion, the requirement for a flexible and lightweight setup to ensure crops can be established in tricky conditions but sown with precision and a light ground footprint, has never been more important," explains the firm's Rhun Jones.

"We took the forward step of design and manufacturing our first 6m unit three years

ago to meet an order from PX Farms in Cambridgeshire who specifically wanted a light but strong framed tine drill for drilling cereals and beans," he explains.

Available in working widths of 3m, 4m, 4.5m, 4.8m, 5m and 6m, 250hp upwards is required for the 6m TDT. The drill is supplied with a Cat 3 and 4 linkage headstock and uses 20mm Grange tines across four rows on the toolbar frame at a tine spacing of 250mm.

An interesting feature of the design is the use of contouring wings which have a pivot pitch of up to 5° side to side integrated into the carrying frame above each wing to allow for undulations and varying terrain, maintaining seed depth



This year's Cereals Event saw Grange Machinery enter the drill market for the first time with its Tine-Drill Toolbar (TDT).



Grange Machinery's Rhun Jones believes it's never been more important for a flexible and lightweight setup to ensure crops can be established in tricky conditions but sown with precision and a light ground footprint.



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Drills

▶ across the full width of the drill. High chromium tips with a strategically placed 2cm carbide nose tile, does most of the work of the coulter, but also creates a drainage channel below where the seed is placed. Tines are followed by double rear harrow frames which are height and pitch adjustable and fitted with a Z-tine harrow system.

Hydraulic seed depth adjustment allows for easy change on the move with each of the land wheels having a pair of tines positioned equally behind them in the frame to remove all wheelings.

The drill can be specified with either one or two distribution heads for seed-only or a grain and fertiliser combination.

An LED road lighting kit come as standard along with depth adjustable track eradicator tine brackets to accept various manufacturer eradicator tines.

The front tank can be set for the customer's preference and can be specified according to the type of metering system preferred, or other features that they'd like to have incorporated into the system. Grange Machinery is working with all mainstream manufacturers' front tanks to use in combination with the rear mounted Grange TDT.

Further options include a rear access platform and seeder mounting bracket, Stocks Turbo Jet 8 i-Con seed applicator and rear bar fitted with seed pipes and outlets brackets for Avadex or slug pellet application.

Lemken

The new mounted Lemken Solitair with a working width of 3m and 4m is equipped for both conventional and conservation tillage.

The MR series features a 1500-litre tank which is suitable for fertiliser even

Wet weather wonder

Power harrow combinations may not be the most fashionable drilling outfit, but for Guy Hitchcock and his son Will, their new Kuhn 6m HR 6040RCS power harrow with BTFR 6030 seeding unit and TF 1512 front tank, has more than proved its worth in a testing year.

The Suffolk arable farm has kept to its original cropping plans this season thanks to the drill's arrival in January, which has allowed all crops to be established successfully even when drilling on wet soils, as Will explains.

"We've always run a power harrow combination drill as it's integral to getting land prepared and a crop established following sugar beet harvest," says Will. "It's one of the wettest years we've known and getting every seed in the ground that we'd originally planned at the start of the drilling season is nothing short of a miracle. We've only re-drilled 3ha of field corners, which was originally sown with our previous machine."

Chapel Farm in Ringshall, is an 800ha arable farm growing first wheat, oilseed rape, spring barley, winter rye, and winter beans. However, the crop that governs the rotation is sugar beet, which has been a mainstay on the farm for several decades.

The Kuhn combination arrived from local dealer Ben Burgess, replacing a 6m Horsch trailed power harrow combination. Part of the reason for changing from a trailed to a mounted setup was to maximise the John Deere 8RX 410's weight distribution, with the TF seed hopper counteracting the power harrow and seeding unit at the rear.

"We liked the Horsch drill but the weight of the whole implement on a trailed unit was becoming an issue for us and we could regularly see wheelings. We're planting a crop in 10 months of the year, so having the machinery that allows us to get across the ground in all conditions is paramount."

The Kuhn combination is the only cereal drill on the

The Kuhn 6m HR 6040RCS power harrow combination is the only cereal drill at Chapel Farm and sows upwards of 600ha per year.



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farm and sows upwards of 600ha per year. It's carried out more than 300ha of spring drilling and there hasn't been one blocked coulters, says Will, who admits they've drilled in some testing conditions.

"If we haven't blocked a coulters this year, I'm really not sure how you can block one," says Will. "When the drill arrived, we set it up on a 3.5ha field I had ploughed the night before after an inch of rain.

"I was convinced we'd have issues as the conditions were rotten and we wouldn't have taken the Horsch in there. However, the Kuhn setup managed it with no blockages or misses and the crop looks great now."

Will confesses to being quite amazed at some of the land he's been able to drill, and says the farm hasn't regretted getting crops established, even in the poor conditions, as the optimum seed-to-soil contact at drilling gives crops the best chance. Output in good conditions is up to 30ha/day, while less-than-ideal soil requires a slower speed and 20ha/day output.

Part of the drill's ability to cope in wet conditions is down to the offset disc arrangement on Kuhn's Seedflex coulters, which allows mud and debris to escape easily rather than being sandwiched between two parallel discs. Once the seed has been placed in the slot, the following press wheel and thicker covering tines with angled ends provide good soil coverage over the seed slot.

"We used to experience mud compacting between the discs on our old drill which would eventually cause blocked coulters as it has no way of clearing itself. This meant downtime to clean them out when it happened. Another benefit of the mounted machine is we can lift it up over wet spots, rather than having to drag it through and risk getting stuck."

The flexibility of the Kuhn TF 1512 front tank has also been praised. "It's a single calibration barrel which takes less than three minutes to complete and settings can be saved in the ISOBUS screen for future fields. We're also safer loading seed in the TF hopper as the operator can stand on the ground with the tank lowered to split the bags – it's like loading a fertiliser spreader rather than a drill.

"The drill's versatility means we could never rely on a conventional drill for everything. This was proved when we helped neighbours this year who couldn't get spring crops established," concludes Will.



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Claydon

In 2012 Mark Robinson and his father, Philip, direct drilled the crops on their Lincolnshire farm for the first time. The benefits over conventional establishment have been so significant that the pair have just replaced their original Claydon drill with the latest version as an important step forward.

“Direct drilling has changed how we operate,” states Mark. “Without Claydon Opti-Till it’d be impossible to manage the area that we do.”

The switch to direct drilling on the 400ha of variable land at Westby, near Grantham, was one of a series of alterations which the father and son team made to their operation during 2012 in response to changing market conditions.

Originally they farmed 180ha, with 120ha of winter wheat, winter barley and OSR

which was established using a traditional approach, as well as farming cows and sheep. The land was ploughed, a McConnell Shakaerator used to remove compaction, then crops went in with a 4m Kuhn power harrow / Accord drill combination.

Having been impressed by the performance of a crop of OSR drilled by a contractor with the Claydon SR, they ordered a 3m version of the company’s then-new Hybrid drill and a 7.5m Claydon Straw Harrow.

“Changing how we established crops was a big step into the unknown but we’ve never regretted that decision. The crops are much better than we achieved with our previous approach. There’s been a marked improvement in soil structure so we can travel on the land much more easily with far less damage,” says Mark.



The Lemken MR series features a 1500-litre tank which is suitable for fertiliser even in its basic configuration.

► in its basic configuration.

The tank is optionally available with a 2000-litre capacity which can be split 60:40 on request for simultaneous application of several components. A further 200-litre MultiHub can be added to the tank so multiple crop systems can be cultivated in a single pass.

Seed from the MultiHub is placed via the existing

seed lines or via a baffle plate in front of or behind the harrows. To make it user-friendly, the MultiHub control is fully integrated into the user interface of the ISOBUS terminal as an additional seed line.

The drill is equipped with the maintenance-free OptiDisc coulters with row spacings of 12.5cm or 15cm and

"The first year was wet and conditions were challenging, especially when drilling into grassland which hadn't been ploughed for years, but we were pleased with the results and saw no drop in yields, nor have we since."

Having direct drilled for many years, Mark adds that yields are consistently higher than before while organic matter levels have increased to 5% or 6%. "Whatever the season or conditions, the soils seem to right themselves without any requirement for remedial action and the more we use the Claydon system the better they become. There are far more worms to take down harvest residues and create capillaries that move water down into the profile."

"By the time our 3m Hybrid was 11 years old it was covering around 400ha in the autumn. On this land you can't risk being late when establishing crops, so we wanted a drill with more capacity to get the work done faster and the option to apply fertiliser at the same time."

Recently, the Robinsons took delivery of a new Claydon Evolution, the model which replaced the Hybrid. "After seeing the latest Evolution at Cereals 2023 we decided to upgrade to a 4m rigid chassis seed and fertiliser model. It incorporates all the traditional Claydon features that we like – a

simple design, easy maintenance, lots of clearance and the leading tine/A share configuration, but it can apply fertiliser at drilling, has a third hopper, front discs, auto-reset tines and is easier to calibrate – making it even more versatile."

The dual metering mounted M4RF drill has a 2500-litre hopper with a 50:50 seed to fertiliser split, delivering fertiliser below the seed (front leading tine), beside the seed (seeding share or 'LD' low disturbance twin tine) or split between the two.

With a recommended minimum power requirement of 200hp and daily output of around 30ha, this model has a self-levelling chassis which grades the soil and follows contours. It has wheels which run on undisturbed ground for exact seed placement, includes a full range of rear toolbar and seeding options, GPS speed sensing, electronic metering, a four-channel drill computer, tungsten carbide facings on the leading tines, 13 seeding tines, and hydraulic/shim seed depth adjustment. The optional 90-litre hopper enables venturi, toolbar or inter-row seed distribution.

Although Mark initially questioned whether the 4m M4RF was the right choice, experience has shown that it's well-suited for their situation. "The Evolution provides the capacity to drill what we



In 2012 Philip and Mark Robinson direct drilled the crops on their Lincolnshire farm for the first time and have recently purchased a Claydon Evolution to continue their journey.

want, how we want and when we want, then simply rake and roll. This spring was so wet that in some of the most difficult areas we went over them with the drill tines in the ground but not seeding just to loosen, aerate and dry the soil, before then drilling the crop and applying urea.

"The Claydon Evolution suits us perfectly – we like the fact it's heavier and more stable, has automatic depth control and places seed onto a bank of soil, not in the slot as disc-type drills do, so it never becomes waterlogged even in very wet conditions."

Here's an idea

A maize drill that's so advanced it uses less seed and fertiliser

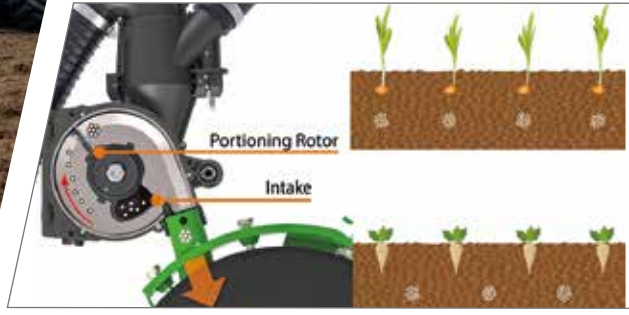


Precea precision seeders come in a range of working widths from 3 – 6 m mounted and now the all-new, trailed Precea TCC, in 9 m and 12 m.

The drill utilises the exceptional PreTeC seeding unit which offers second to none seed placement and optimum seed/soil contact for maximum germination. Automatic singling adjustment on the move and individual row shut-off for pin-point seed accuracy for the 'ins and outs' means zero seed wastage.

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Drills

► features parallelogram-guided double disc coulters and trailing depth control rollers for uniform field emergence. To achieve this, the coulters system is available in a hydraulic version (up to 70kg coulters pressure) and a mechanical version (up to 45kg coulters pressure).

Both coulters pressure and seed depth can be adjusted independently and don't affect one another.

According to the firm, this is particularly useful in the increasingly popular cultivation of mixed crops.

The correct placement depth for the different crops can be set by applying a separate drilling depth setting to each second row. Seed should always be placed at the same depth, even at high forward speeds and in changing soils. The depth control roller then presses seed down to aid quick and even emergence.

The distributor heads, which are positioned directly above the coulters bar and don't require a seed return function, should ensure transverse distribution.

The new drill is equipped with two metering systems which each supplies one distributor with seed so that even



The new mounted Lemken Solitair with a working width of 3m and 4m is equipped for both conventional and conservation tillage.

the basic configuration offers width section or half-width control. A hydraulic tramline mechanism can be added as an option. The iQblue Drill software supports the work in the field for example, by checking if tramline control is possible.

For those opting for the single or

double shot version, the MR comes with four metering units for two width sections each. This means each of the two distributors can be supplied with both components (single shot) or each of the four distributors can be supplied with one component each (double shot). ■

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“ I’m aiming to bring the soil back to life. ”

Healthy soils on the horizon

On-farm opinion

Moving into a regen farming system requires both time and patience with the drill playing a fundamental role in this transition. CPM speaks to a farmer who’s aiming to reinvigorate his soils using his latest investment.

By Melanie Jenkins

Direct drilling is an integral aspect of Ben Peplø’s regen approach on his family farm, and with the latest purchase of a Horizon DSX 60-25 drill with liquid fertiliser and row cleaners, this signals his commitment to continuing down this path.

Ben, the fourth generation at JHP Farming near Swindon, returned from his studies to bring the business back in-house four years ago and has since shifted operations from a previously traditional approach towards focusing on regen. “I’m still trying to find my feet with it but with all the grants, government assistance and Sustainable Farming Incentive (SFI), alongside the fact it’s the right thing to be doing, it only seemed fitting to adopt it,” he explains.

Ben says he didn’t rush out to buy lots of machinery to make this transition, but instead works with the man who previously rented the farm and has an agreement to

use his kit by paying an area fee. “When I decided to move to direct drilling he chose to do the same and bought a Claydon drill. Because of our arrangement it means I have the option to use his tine drill if I want to.”

On Ben’s 486ha – 304ha of which are cropped – he largely ran a Sly Boss no till drill until moving to a Horizon this year. “We’re aiming to do everything we can to keep the farm no-till and part of this is not having a set rotation. Instead, I plant what fits and can change this each year depending on conditions and the season,” he explains.

Like so many others this year, Ben has found conditions to be challenging. “Between mid-September and mid-April the weather station on the farm recorded 1m of rain, so we did bring our cultivator out but only where we absolutely had to. And really, the past few autumns have made life pretty difficult, so by reducing our soil movement I’m hoping this will help us to cope with changeable weather conditions.”

Wider windows

And so far, he’s noticed his working windows appear to be getting wider, rather than shrinking, despite the tough weather conditions. “I was able to drill during the frosts in January using the Sly Boss and now have a cracking crop of wheat. But admittedly, you do get one shot with direct drilling and you have to get it right the first time, which is why it’s important to spend the time setting the drill up right.”

Blackgrass poses a challenge on the farm and Ben has been working to combat it. “I feel like we’re making strides although

there have been a few back pedals, one of which has been with oilseed rape. I’m probably going to drop it and bring in other break and cover crops instead.”

With a variety of soils on the farm ranging from chalky clay loam to silt, Ben wanted a single machine that could be versatile and work across the spectrum, which is one of the reasons he’s invested in Horizon’s DSX. “With the DSX I’ve opted for 25cm row spacings and row cleaners because I’m aiming to chop more straw on the farm. I know we’ll likely have to manage the slugs



Farmer, Ben Peplø, has made the transition to regen farming on his home farm with direct drilling playing a significant role in the process.



The parallelogram on the front of the Horzion DSX mounts onto the frame, has 32cm of individual travel per row unit and hydraulic downforce of up to 300kg if required.

but it should help prevent the weeds from breaking through.”

According to Horizon’s Rhodri Davies, the row cleaners operate off the tractor’s pneumatic system which can be controlled via the cab.

“These can run about 1cm above the soil so they’re just into the stubble, moving a band of around 80% of the residue over slightly to help avoid hair pinning in the slot when shallow seeding.”

The two different angled discs of the DSX had caught Ben’s attention due to their ability to work in hard ground. “I looked at other drills before buying the Horizon but these had straight discs and I didn’t think they’d be as suited to working my hard ground, which can put a lot of strain on a machine.”

His first outing with the DSX saw him plant a cover consisting of clovers and serradella (common bird’s foot). “The crop went into pretty hard ground but it was very successful,” he notes.

Kit advancements

One of the main benefits of the machine is the row unit whereby the parallelogram on the front which mounts onto the frame, has 32cm of individual travel

per row unit and hydraulic downforce of up to 300kg if required, explains Rhodri. “The disc, which has a 10° undercut and is 7° off the x-axis, works similarly to a plough in the way it pulls itself through the ground without much downforce.”

One aspect of the drill Ben was keen to change was to have the depth control and closing wheel separate. “On the Sly Boss the pressure on both the discs and the closing wheel was the same as these were positioned together, so in some cases you’re firming the seed into the slot far too much and there wasn’t a way around this. But with the DSX there’s a Güttler seed slot shutter wheel and this works far better for me.”

The DSX also has an airbag on the back and closing is pneumatically controlled from the cab with up to 90kg of downforce available, explains Rhodri. “In instances where ground is particularly dry and has baked out, users have the option to put pressure on closing the slot.”

Ben also feels the DSX will be more user-friendly for operators as the fan is at the front and distribution heads are at the rear, allowing for a better view, unlike his previous drill ▶

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On-farm opinion

► which was set up the other way around.

Ben regularly goes out into his fields with a spade to examine how his soils look at depth. "I've seen the worms come back and roots stretching between the rows. By not cultivating, all the fibrous material is staying underground and this then helps with drainage – and some of my fields have never been known to drain so well as they do now.

"I've always been told that you'll get to a point in this process where your ground is healthy enough that it'll forgive you for what you do to it. But we're still early into the transition and we're continuing to try and increase the fibrous activity in the soils."

When drilling, Ben also dribbles soluble microbes and phosphate mixed with molasses as a food source alongside his home-saved seed. "This is the reason I opted for the liquid element on the DSX – I'm not looking to put harder fertilisers on with it, but the option is there if I did want to."

When Ben took receipt of the DSX it arrived with the liquid fertiliser system mounted on the rear of the drill, but he decided he wanted it on the front of tractor instead, explains Rhodri. "It's a 1500-litre liquid system, but it was only a case of removing four bolts, some pipe

and cable and we were able to mount it onto the tractor within about an hour."

Cover cropping

Ben's DSX has 4700-litre pressurised tanks split into three hoppers (50:10:40), which means he can buy cover crops as straights and plant three seeds at once. "The drill has the capacity to lock up individual coulters and if you blocked off distribution heads, this would allow you to drill at even wider spacings."

Another attribute he likes is the modularity of the drill. "I could decide to take the drill from 6m up to 7.5m on the same chassis, and if I decided 25cm row spacings no longer worked for me, Horizon would add more row units rather than sell me a new drill."

His only reservation was that some of his fields are inclined and he was concerned that despite the low draft of the drill, his 180hp New Holland T7 225 would struggle to pull the weight up the hills. "However, it manages absolutely fine and so far actually appears to pull a lot easier than my old drill."

Although Ben's Sly Boss had large tyres, these were slightly domed and so exerted



The DSX has an airbag on the back and closing is pneumatically controlled from the cab with up to 90kg of downforce available, explains Horizon's Rhodri Davies.

more pressure in the centre than the outside. "The large tyres on the DSX are a lot flatter meaning the weight is distributed more evenly which is better for the soil."

And protecting the soil is all part of Ben's long-term goals for the farm. "I'm aiming to bring the soil back to life and I'm hoping my land will respond to what I'm doing." ■

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Treading a new path

Tyres

Returning to agricultural tyre manufacturing has seen Continental design its new products from the ground up by introducing new technologies and improving efficiencies. *CPM* finds out why tyres are back in focus.

By Rob Jones

Continental bounced back onto the agricultural scene in 2017 and now boasts multiple tractor tyre lines including specifically designed harvester and telehandler options. UK sales manager Tom Godwin explains how and why this renaissance is bringing new tyre technology to farmers.

"Tyres are the only part of a machine that contacts the ground. Obvious, but it makes the way the tyres perform an extremely important part of agricultural machinery efficiency. The right tyres, set to optimum pressure for load and application, can help improve fuel efficiency, save time and provide safety and stability to operators," says Tom.

Why the return to making agricultural tyres? "Continental built a new manufacturing plant in Lousado, Portugal, at a cost of more than €50M, solely for the

production of agricultural tyres. This investment alone should go some way to explaining the importance of tyre technology to agricultural progress," he says.

Various sources suggest the agricultural tyre market is worth around \$7Bn dollars globally. *Tyres and Accessories* publisher Tyrepress ranks Continental as the fourth largest tyre producer in the world. This, suggests Tom, is the basis from which the decision was made to return to agricultural tyre production.

Knowledge sharing

"Continental has an agricultural research and development facility at Lousado that works with our team in Hanover to develop and test new tyres for agricultural machinery. The team shares knowledge with others at Continental who design and manufacture truck, earthmover, and other specialist tyres. Together, they're pushing the boundaries of what tyres can provide in a wide range of machinery sectors," he says.

Tyres fulfil a great many functions: a tractor tyre must be capable of carrying the weight of the tractor and any additional load such as ballast and implements. However, Tom is keen to emphasise that the tyre is the vessel, and it's the air within it that's doing most of the work.

"Consider the difference between truck and tractor tyres – the size, shape, pressure and load bearing capacities are almost at opposites. Trucks have to carry heavy loads on relatively small tyres set to a

high inflation to improve rolling resistance on the road. A tractor has to carry heavy loads on soft ground, so much more air is required to prevent it sinking," he says.

The upshot of the additional air which tractors rely on is the calculation of the optimum pressure for load and application. Too high and the tractor sinks and digs into the soil, causing compaction. Too low and the tyre footprint becomes hard to drive forward and can be unstable, explains Tom.

"Tractor tyres have to carry load while providing operator comfort in a way that improves how the tractor drives and performs on a variety of ground conditions. This includes steering, grip, stability and braking. It's a lot to ask while also

demanding that the tyre performs for thousands of hours and delivers good fuel economy and power transfer during this time," he adds.

So what's Continental done differently? If there was a part of the tyre development process which could potentially be improved, the

Continental team looked into it, says Tom. "With the benefit of a blank canvas to

build a new production line, almost everything was up for review to help make the new generation of tyres more efficient.

"We've developed an entirely new single wire bead core – this is the part of the tyre that holds it to the rim. Historically, tractor tyres have been manufactured with up to 10 wire beads, joined together to make one bead core. These 10 joins present weak spots which is why we've designed a bead with only one join," he says.

“Pressures are a function of weight, load and surface area.”



Tractor tyres have to carry load while providing operator comfort in a way that improves how the tractor drives and performs on a variety of ground conditions, says Continental's Tom Godwin.

► Rubber is a relatively small component of a tractor tyre and Tom suggests the way the tyre is formed, and other materials used, are as important to the way the tyre performs during its lifespan.

“When designing our new production line, we chose to change the moulds that tractor tyres are made in. Typically, a tyre can be made of around five sections which are fused together, but our tyres are made out of two because we’ve been able to redesign the production line and make larger moulds. This makes the tyres stronger and improves the overall roundness of the tyre,” he says.

In the round

And while it might seem strange to want to improve roundness when all tyres are circular, Tom points out that some tyres are actually rounder than others. “Think about flat spots that occur when tyres cool in a stationary position. When a tractor is hauling trailers all day in hot harvest conditions this’ll cause the tyres to heat up and become softer. The heavy weight of the tractor when stationary then forces the tyre to become flatter in one section, resulting in flat spots,” he says.

To mitigate this, Continental has coined yet more new manufacturing methods and even developed a unique material which sits underneath the tread layer of the tyre, explains Tom. “It’s called N.flex and is a patented nylon which provides greater flexibility and helps the tyre to resist damage, while also helping it to return to its round shape faster. This means that when flat spots occur due to the machine being parked overnight, the operator will see the effect of the flat spot disappear faster as the tyre recovers to its round shape.”

So why go to the trouble of making so many changes? “Modern agricultural machinery is more powerful and to realise the benefit of that power, the machine has to be able to transfer it through the tyres to the ground, be this fuel efficiency or the effective transmission of engine power.

Soil compaction has become something of a buzz term in recent years with more farmers focussed on soil health. Tom suggests that Continental has been at the forefront of providing the tyre technology required to help run heavy machinery in a way that’s less detrimental.

“Pressures are a function of weight, load and surface area. The load of a 60kg woman in high heels exerts 1.06kg/cm² when standing still, and this increases to 240kg as she walks, because the majority of her weight goes through

the heel of her shoe which has a tiny surface area. A 5500kg tractor, with its tyres set to low pressures, can travel over the ground exerting just 1.4kg/cm² because the air in the tyres is spread over a wide footprint,” he explains.

Continental has been running its ‘Stamp Out Soil Compaction’ campaign for four years in a bid to help operators better understand the fundamentals of tyre design and what tyres can do to improve soil health, says Tom.

“When we launched our VF (very high flexion) tyres we wanted to demonstrate the efficiencies operators could gain from having the technology. In essence, VF provides the ability to carry 40% more load at the same pressure as a standard tyre, or for the machine to run at 40% less pressure than a standard tyre when carrying the same load.”

Continental has brought out VF technology for tractors and harvester tyres and has a growing range which caters for rim sizes from 76-127cm (30-50 inches).

“VF isn’t necessary for all but is of great benefit to some machines. Take a 300-400hp tractor with a 6-8t disc cultivator, it can run VF TractorMaster 650/60R38 front and 750/70R44 rear tyres and reduce the pressure to below 10psi while carrying that load and still transferring all the power from the tractor to drive it forward with minimal slip,” he says.

But tyres only make up part of what Continental does, meaning it’s able to bring other aspects of its portfolio to help improve agricultural tyre performance. “Continental is one of the leading suppliers of technology to the automotive industry, specialising in brake systems, instruments, systems and components for powertrains and chassis, vehicle electronics, infotainment solutions,



VF tyres provide the ability to carry 40% more load at the same pressure as a standard tyre, or for the machine to run at 40% less pressure than a standard tyre when carrying the same load.

and technical elastomers,” he says.

This means Continental has brought technology from cars and trucks to agriculture, including pressure sensors that provide continual readings to the operator when working.

“ContiConnect Lite is the latest example of our onboard tyre sensing technology. Sensors in the tyre communicate pressure and heat build-up to the operator’s phone or a terminal in the cab via Bluetooth. When combined with a central tyre inflation system (CTIS), this provides the operator with the information required to optimise tyre pressure on the move and prevent unnecessary wear, fuel use and potential tyre failure,” he says.

This technology is also relatively cheap – at £200 for four sensors it’s a tiny supplement to pay considering the cost of four new tractor tyres, highlights Tom. “Continental has also developed a free mobile app that calculates the optimum pressure for load of any Continental tyre manufactured since 2017.” ■



Continental built a new manufacturing plant in Lousado, Portugal, solely for the production of agricultural tyres.

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talkingtaties

by Andrew Wilson

Variable outcomes

Somewhat predictably, given the rain, it's a light land year. Our winter barley is all cut and varied in yield from not quite 6t/ha to a reasonable 7.9t/ha, with the average tantalisingly close to 7t/ha. In old money, it's not quite done three ton! There's a decent amount of straw though, and we haven't yet had to start the dryer up, which is pleasing.

The wheat will be next, which is variable – the yield difference between area sown and area harvested will be a little depressing, but what is there looks decent quality at least. The early sown spring barley will follow on, with a mishmash of oats and barley as they get fit and beans sometime in September.

Prices are a bit rubbish, but root crop driven cashflow dictates that we've sold some of our crop. The markets take some following these days, so I pretty much do the same as dad did – sell about a third of expected harvest forward, a third at harvest, and sell whatever is left when the price looks like it's a good idea to shift it. Being the cynic that I am, low wheat price equals cheaper fertiliser, so I've bought a load of urea!

Root crops look half decent at the moment. We've managed to avoid cercospora and virus in the beet so far and have fed it some trace elements and salt in the recent sunshine. Will it stack up next year? I have to say I'm not exactly hanging the bunting out over next year's contract proposal so our area will see a trim.

As seems to be the case too frequently, we're required to provide ever more data for free just for the privilege of selling our crops. This is becoming tiresome, not least because of the absolute disregard for the effort required to provide this information for no extra income. The whole process of growing the crop has become higher risk and more time demanding – essentially far more of a 'chew on' than ever it used to be, for a smaller reward.

One can no longer fix the price of 100% of contract, which raises the risk immediately. The market has to lift significantly for there to be extra meaningful reward to offset that risk. Futures in the last 12 months have moved by more than 100%. I guess when the market is at its current low, surely things will improve – I'm ever the optimist.

The potatoes always look good in full flower – it covers up any puny plants and feels good driving through them with the sprayer. Speed of growth has been significant as it always is in a late season, and in some fields, we've had to be keen with trace elements to maintain momentum.

Maleic hydrazide (MH) timing is upon us, but at this point in time (early August) just coming

out of a hot spell, I'd prefer cooler days rather than just cool nights. MH is the absolute cornerstone of sprout control for us and it always pays to be fussy over its application which can be frustrating sometimes, not least because it's not a fast job at 500 l/ha!

The rots in seed that I spoke of last month have produced some puny blackleg infected plants, which will hopefully dissolve sufficiently to not be a problem at harvest or in store. We've also managed so far to keep blight out of our crops, but I'm not looking forward to working out what it's cost to do so.

Rainfall in reasonable amounts has kept the irrigators parked up for most of the season, and with August often the wettest month of the year and more bodied land than normal, will it stay that way? Hopefully – I'd rather dry a bit of corn than lay more pipes this late.

Cover crop drilling here will be a spread-out affair, with a couple of fields now cleared but most still occupied by wheat or late sown spring cereals. I've had a review of how we go about this mission, and for various reasons, have simplified our seed mixes from the six we had last year to three this time.

Principally, one for high nematode pressure, one for low nematode pressure and one for pre-spring cereals. This is inevitably partly driven by seed cost, but also efficiencies in getting them sown with a smaller team than normal. I drilled my first cover crop back in 2011 and every year since has seen some learning both from our own activities

and that of others, be that other farmers, trials, research bodies or seed suppliers.

My philosophy is simple – fundamentally I believe that there's always a better way of doing everything and if it works, keep doing it, if it doesn't, work out why and change it. What's often overlooked with cover crops is the side effects – some components can have a negative effect on things like free living nematodes which can affect future cropping.

Diversity is key, but not at any price. What I've found is that a four-way mix works very well. Two isn't sufficient and anything over six is unnecessary. Our pre-root crop mix this year includes a multi-resistant radish, vetch, buckwheat and oats. High nematode pressure essentially dictates two varieties of radish and black oats as opposed to normal tame oats, which is obviously a more expensive mix.

Taty lifting (as we call potato harvesting in these parts) and cereal drilling will soon be upon us, so may I wish everyone a fruitful and safe back end.

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.

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“ If we’re able to manipulate the endophytic grass a little better using this knowledge, it potentially could be another control option. ”

Sugar beet agronomy

A grass containing endophytes is showing promise in controlling two key sugar beet pests. CPM speaks to researchers to find out more.
By Mike Abram

Pest-killing grass

Endophytic grasses have the potential to play a role in management strategies for two key sugar beet pests, according to the latest research. In fact, two projects investigating practices to control free-living nematodes and aphids transmitting virus yellows have tested the use of such a grass, which has been bred in New Zealand.

Marketed by CropMark Seeds, ‘Barrier festulolium’ is a cross between ryegrass and meadow fescue, explains University of Nottingham MRes student Athreya Shetty, who’s been investigating their use to combat aphids.

“What’s special about this grass is it associates with a free-living mycorrhizal fungus in the soil, which forms a symbiotic relationship with the grass, living in the seeds, leaves and stems. We think when the grass is stressed, it triggers a defence response in the fungus to secrete alkaloid-based materials called lolines,” he adds.

These are thought to repel insect pests and alter soil chemistry – in New Zealand and Australia, the grass is used to protect grazing pastures against root and top feeding insect pests such as grass grub larvae, black beetle adults, porina caterpillars, Argentine stem weevils, red-headed cockchafers and root aphids.

This has led now led to the two BBRO-funded projects investigating whether the grass can be integrated into UK sugar beet rotations as an alternative to neonicotinoid seed treatments or nematicides.

Masters research

For aphid control, Athreya is trialling different methods of incorporating the grass into the sugar beet crop for a one-year masters project, co-funded by The Morley Agricultural Foundation.

Two main methods have been trialled so far – grinding the grass seed into a meal and incorporating into the soil, or growing the grass as an overwinter cover crop.

Early glasshouse findings with the seed meal have shown some promising results, says Athreya. “With higher doses of the



Student Athreya Shetty is trialling different methods of incorporating endophytic grass into sugar beet for a one-year masters project. Photo credit: Mike Abram.



Barrier festulolium is a cross between ryegrass and meadow fescue.



Two BBRO-funded projects are investigating whether the grass can be integrated into UK sugar beet rotations as an alternative to neonicotinoid seed treatments or nematicides.

- ▶ endophyte grass seed meal there seems to be a much healthier beet canopy. It hasn't prevented virus infection in the beet, but it does seem to make it more resistant.

"There's definitely some kind of growth-boosting effect that the seed meal is having, but we don't know what specific chemical in the meal is causing that effect," he adds.

Three different management tactics are being tested with the overwintered cover crop field trial – spraying the grass off with glyphosate before drilling beet, using shallow tillage and incorporation before drilling, or leaving the grass as a strip crop in between beet rows.

Alkaloid secretion

"The idea is to look at whether the sugar beet can pick up the alkaloids the grass has secreted into the soil, and whether that affects virus behaviour and also aphid migration patterns in beet generally," explains Athreya.

In the trial, the grass was sown in October with its development slowed by winter weather. In years of better vigour, mowing or grazing might be useful as it would trigger fresh growth, he suggests. "The more you disturb and stress the grass, the more chemical will be secreted."

And unlike some endophytic grasses, Barrier festulolium has been found to be completely livestock safe, he notes.

A previous trial carried out by Dr Alistair Wright at BBRO suggests leaving the endophytic grass growing in strips between the beet reduces virus yellows infection, but also reduces yield because of crop competition.

"So we're trying to define what timing you

should kill the grass, or how long you can leave it," says Athreya. "A third option which could be used for future work is to apply the grass as a dried hay amendment or mulch."

Growing the endophytic grass as a cover crop is also one of the potential solutions for controlling free-living nematodes that cause Docking disorder in sugar beet. Caused when stubby root nematodes feed just behind the root cap of tap roots,

the disorder, named after the Norfolk village where it was studied extensively, produces brown necrotic lesions, fanging and yield loss of up to 50%.

Feeding by another free-living nematode, longidorus needle nematodes, can also cause patches of uneven sized beet plants, sometimes with nitrogen or manganese deficiency. Swellings or galls can occur at the root tips often with local necrosis around where feeding took place.

Since the ban on Vydate (oxamyl), chemical management options for free-living nematodes have been limited to a nematicide made from garlic extract. That led to Nyambura Mwangi's PhD project which looks at cover crops as an alternative way to suppress stubby root nematodes.

Two main types of cover crops have been tested within the project – brassica species and endophytic grasses, explains Nyambura, with work taking place in field trials in Norfolk and Suffolk.

"In Suffolk we investigated the brassicas Indian mustard, oilseed radish and Daikon radish. At this site we observed suppression of nematodes where we grew and incorporated the cover crop compared with leaving the land fallow overwinter."

The brassicas contain compounds called glucosinolates which when broken down form isothiocyanates, which have been shown in previous studies to be

Healthy roots



Fanged roots



Docking disorder in sugar beet is caused when stubby root nematodes feed behind the root cap of tap roots producing brown necrotic lesions, fanging and yield loss of up to 50%.



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PhD researcher Nyambura Mwangi's is looking at cover crops as an alternative way to suppress stubby root nematode.

▶ nematicidal, she says. "So we checked in the lab and found the nematicides were sensitive to isothiocyanates."

The second trial in Norfolk included brassicas and cover crops species from other plant families, including endophytic grasses. "Unfortunately, we didn't see the same effect from the brassicas that we saw in Suffolk," says Nyambura. "We think the main reason was, unlike

in Suffolk, we didn't achieve a good biomass from the brassica cover crops."

Biomass importance

Biomass plays a critical role in nematode suppression as it's directly correlated with the amount of glucosinolates and subsequent release of isothiocyanates the nematodes will be exposed to in the soil.

The Norfolk trial did pull out some differences in performance from the brassicas, which had also been evident the year before, she comments, with higher multiplication of nematodes in the Indian mustard than in the oilseed radish.

That perhaps points to different mechanisms in how the cover crops could impact nematode numbers, says project supervisor Dr Matthew Back, from Harper Adams University.

"You can have plants that are a poor host for nematodes and act as a trap crop, and then also the partial biofumigation effect," he says. "At the Norfolk site, there were very small Indian mustard plants which probably weren't exerting much of a biofumigation effect yet were hosting the nematodes to some extent.

"But it was the other way around in Suffolk, where there were decent sized plants, the only possible explanation [for the suppression of nematodes] if the mustard

is a host, is through partial biofumigation."

The results suggest growing a high biomass crop of Indian mustard is crucial for nematode suppression. "We're looking for around 50t/ha fresh material," suggests Matthew. "Having a material rich in glucosinolates that's chopped and incorporated, as well as pumping out the compounds while growing, will help suppression.

"These stubby root nematodes are very susceptible to soil disturbance, so if you disturb the soil you will see some suppression, but if you have a lot of material rich in glucosinolates that'll be broken down into isothiocyanates, you're going to achieve an even more powerful result.

"So the message with Indian mustard is you have to grow it well in order to achieve this kind of suppression," he stresses.

That could mean adding 80-100 kgN/ha to help with biomass development. "We'd also suggest applying 25kgS/ha because sulphur increases the concentration of the glucosinolates as they're sulphurous molecules."

It also means establishing it in the summer months – perhaps in July rather than August – to achieve the biomass required.

Growing oilseed radish is lower risk, in comparison, with a more flexible drilling

Low carbon beet scheme offers incentives

A pilot scheme incentivising growers to use nitrogen placement to apply fertiliser near sugar beet seed, increasing nitrogen use efficiency and lowering carbon emissions associated with the crop, has been launched by NFU Energy and Nestlé.

The scheme, which offers a payment of £28/ha from Nestlé, was fully subscribed within 24 hours of its launch in June with around 20 growers taking up the available contracts.

Developed by NFU Sugar in partnership with NFU Energy and Nestlé, it's being delivered via the Landscape Enterprise Network (LENs). A key aim is to test whether such incentives can be used to encourage uptake of lower carbon production methods, such as N placement, which typically requires less nitrogen to be applied.

Nitrogen placement involves using either specialised or retrofitted equipment to place fertiliser around 5cm to the side and 5cm below seed. Research suggests this improves nitrogen use efficiency allowing applied nitrogen to be decreased by 10-20%.

Reductions in applied nitrogen would lower Nestlé's scope-3 greenhouse gas emissions for its products using sugar. A reduction in scope-1 emissions is also possible through reduced fuel use and lower nitrous oxide emissions from the soil.

If successful, NFU Sugar hopes the pilot will pave the way for further opportunities to work with supply chain partners in incentivising growers to adopt lower carbon production methods.

Working directly with supply-chain partners offers the opportunity to inset home-grown sugar emissions, unlocking value that



A pilot scheme incentivising growers to use nitrogen placement to apply fertiliser near sugar beet seed has been launched by NFU Energy and Nestlé.

already exists within the beet supply chain to reduce the carbon footprint of not only farmers, but processors, manufacturers and retailers further down the chain, says NFU Sugar.

"Direct grower-customer projects ensure that funding targeted towards the delivery of environmental services on-farm is ringfenced for growers, while empowering them to broker the terms of delivery," it suggests.

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▶ period. "It's almost a sure-fire system in that it's clearly a poor host and it might also have some partial biofumigation effects. A little like Indian mustard, if you grow a better crop, there's more root material, which in theory means you have more surface area to release compounds."

Promising results

Results from growing the endophytic grass also show promise with multiplication rates in plots with the endophyte lower than where the grass was grown without any endophytes, says Nyambura.

As with aphids, the hypothesis is that the endophytic grass can suppress nematodes due to the production of lolines. To examine that theory further, Nyambura tested crude extracts from grass with and without endophytes, and also from different ages of grass – eight, 12, 16 and 20 weeks old.

This showed that nematode mortality at eight and 12 weeks wasn't any different in grass with and without the endophyte, she says. "However, at 20 weeks, nematode mortality was greater in grass with the endophyte than without."

Delving deeper to understand these results, she then measured loline, phenolic and flavonoid alkaloid levels in different grass-age combinations. "These showed that the phenolic and flavonoid compounds followed a similar trend to observed mortality, where they decreased as the plant is aging.

"Lolines, on the other hand, increased with increasing age, which was the opposite of the mortality trend, which decreased as the plants aged."

Nyambura has since concluded that the phenolic and flavonoid compounds play a significant role in nematode suppression when



According to Harper Adams University's Dr Matthew Back, growing a high biomass crop of Indian mustard is crucial for nematode suppression.

the grass is young, while as it ages there might be an effect of the lolines, as observed in the 20 week old grass being more suppressive than grass without endophytes.

"Given the consistency of suppression of the grass with endophytes, it would deliver more efficacy than grass without the endophyte," she says.

The data is encouraging, adds Matthew. "We think if we're able to manipulate the endophytic grass a little better using this knowledge, it potentially could be another option, but we require more field work."

As a grass it's more flexible to use as a cover crop over winter than perhaps the brassica options, which have a narrower planting window, he notes. Overall, he sees promise in the use of cover crops as biofumigants for free-living nematode control. "Nematicides were never that consistent against free-living nematodes, even if we think of them as bullet-proof.

"With a trap crop, I think you have a little more control if you get the agronomy right. Once optimised, while they're never going to eradicate the pest, they're going to have a knockdown effect – perhaps of 45-70% – that is going to be useful for farmers," he concludes. ■



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“ It’s about creating a robust system which avoids virus infection in the first place. ”

Potato virus prevention

Potatoes

The 2022 spike in aphid numbers has resulted in a significant impact on the production cycle for seed potatoes, despite populations decreasing since. CPM investigates the steps industry experts are taking to combat the most prevalent potato viruses.

By Janine Adamson and Rob Jones

New genetic material with resistance to some of the most prevalent potato viruses may soon be rolling out into commercial breeding programmes, thanks to development work being undertaken by James Hutton Limited (JHL).

As shared at this year’s Potatoes in Practice, held at Balruddery Farm in Dundee, delegates learned of pipeline

developments from the commercial arm of the institute. Speaking ahead of the event in an exclusive preview interview for CPM, potato breeder Drummond Todd says the uplift in potato virus in recent years has meant breeding programmes have had to widen focus.

Secondary result

“In 2022 we experienced huge aphid pressure therefore many growers observed an increase in virus – most strikingly potato leafroll virus (PLRV) – in seed crops the following year. This is because the symptoms you see in the subsequent year are a ‘secondary’ result of the ‘primary’ infection.

“Although aphid numbers have been substantially lower in 2023 and 2024, due to the length of the production cycle for seed potatoes, that spike will have a significant impact for a number of years. Furthermore, virus pressure will continue to be high as a consequence of increased reservoirs of virus in crops and groundkeepers,” explains Drummond.

But, it’s not all doom and gloom, he adds. Research has been taking place to validate new genetic markers for resistance to potato viruses using molecular diagnostics, similar to the previous work

undertaken for late blight and potato cyst nematode resistance at the institute.

In fact, the team at JHL and JHI (James Hutton Institute) are validating markers for two different sources of PVY resistance and are working on potential candidates for PLRV resistance. According to Drummond, populations have been produced and material is already in the field ready for testing.

“If successful, the markers will then



Potato breeder Drummond Todd says the uplift in potato virus in recent years has meant breeding programmes have had to widen focus.



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Knowledge transfer day

Rain might have tried to stop play at Hutchinsons' potato demonstration day, but knowledge transfer continued to flow on subjects such as wireworm, PCN management, crop safety and nutrition.

Presenting to delegates from one of the yards at Worth Farms in Holbeach, root crop technical manager, Darryl Shailes, highlighted work being undertaken to assess the impact of different strategies on wireworm populations within a crop of popular variety, Maris Piper.

These include a pyrethroid granule which is awaiting approval and a calcium-cyanamide based fertiliser. "At the moment we're focused on the theoretical effects of these products," said Darryl.

Equally, some cover crop species can help to reduce wireworm populations; Hutchinsons is measuring the effects of two different types of buckwheat, a high glucosinolate mustard, a lower glucosinolate standard mustard, and a multi-variety cover crop, he revealed.

Darryl also presented research which explores the potential benefits from growing DeCyst-Prickly (*Solanum sisymbriifolium*) and DeCyst Broadleaf (*Solanum scabrum*), which can be used as catch crops for PCN as well as cover crops.

"We'll be comparing the final populations with those initially present (pf/pi) so growers can make informed strategies on how to reduce PCN infestation," he said.

Simon Faulkner from SDF Agriculture pointed out the importance of developing strategies which aren't dependent on pesticide approvals. "Concerns highlight the importance of knowing which varieties can offer resistance and/or tolerance," he said. "Growers have to manage



Hutchinsons' Ed Brown drew attention to the possible reasons for why PCN may be proliferating, such as too short rotations and a lack of predators for those nematodes in the soil food web.



Hutchinsons' potato demonstration day included knowledge transfer on subjects such as wireworm, PCN management, crop safety and nutrition.

their land to ensure PCN levels are manageable without over-relying on pesticides."

PCN varietal resistance trials which started last year are continuing, he said, and are assessing a mix of older and newer varieties. "We're seeing some additional crisping, packing and chipping varieties which have both tolerance and resistance, which will be important traits going forward."

French marigold (*Tagetes patula*) and certain varieties of oil radish cover crops can be effective at reducing soil populations of root lesion nematode (RLN) *Pratylenchus* spp., explained PhD student Vongai Chekanai from Harper Adams University. Vongai first introduced delegates to her research at 2023's demo day.

As she shared then, the main crops susceptible to RLN include potatoes, onions, carrots, daffodils and other narcissi. In potatoes, *Pratylenchus* is associated with potato early dying disease and poor emergence. Vongai outlined that cover crops can be non-hosts, trap crops, or biofumigants to nematodes. Conversely, other species used as cover crops can be good hosts which support nematode multiplication.

"Our trials indicate that some varieties of oil radish and French marigolds are poor hosts and suppress RLN population numbers, however, Indian Mustard, which is popular as a biofumigant to suppress potato cyst nematodes (PCN), increases *Pratylenchus* spp," she explained.

Michael Rodger from Richard Austin Agriculture updated the event's attendees on the herbicide crop safety trials being held across 26 varieties, including some new coded varieties provided by breeders.

While last year's trials were focused on metribuzin, 'hotter' herbicide mixes have been used this season. Observations will be

made weekly for the next four weeks and the plots will be taken through to yield.

Another area which generated discussions between Hutchinsons staff and growers was agroecological strategies, their benefits and potential pitfalls when not correctly undertaken.

Ed Brown, head of agroecology services at Hutchinsons, emphasised that healthy soils are key to healthy crops and such strategies can deliver benefits for potato crops when delivered appropriately.

He encouraged visitors to explore the principles and keep an open mind with strategies including minimising soil disturbance, maintaining living roots in the soil throughout the year, maximising diversity, and, where possible, integrating livestock into the rotation.

"These activities will help to develop truly healthy soil, thereby growing truly healthy plants which will rely on less intervention but provide better yields and better quality," said Ed.

He drew attention to the possible reasons for why PCN may be proliferating, such as too short rotations and a lack of predators for those nematodes in the soil food web. "We have to ensure the soil food web is balanced so individual species never have a chance to take hold."

Ian Robertson, head of soil services at Hutchinsons, emphasised that nutrient soil indexes don't imply functionality or availability to the plant. He explained some of the interactions of the soil food web – which spans from photosynthesisers at the top level, through decomposers, pathogens and root feeders, and predators at different levels.

"Connectivity between the different levels of organisms is key and as soon as you move soil you lose this, which allows some pests to proliferate above others," he concluded.

► be applied in commercial breeding programmes which is ultimately what JHL is about – commercialising the outputs from science. However, it's important to stress that this work is about progression.

"We have to produce viable varieties so are seeking parental material with solid agronomic and sensory performance together with old and new resistance markers, rather than combat potato virus in isolation. By building and stacking in this way, we can maintain and increase the marketable yield of new varieties," he says.

Drummond hopes JHL's breeding work will help to increase confidence in the future of Scottish seed crops, after a challenging year of downgrades. "There's a full awareness of the size of the problem among growers, we're likely to be looking at continued restriction in seed potato availability in the coming season."

Adding a practical, agronomic perspective to the presentations at Potatoes in Practice, Graham Tomalin from VCS Potatoes says when it comes to ware crops and potato virus, there doesn't seem to be a clear pattern. In another exclusive preview interview with CPM, he explains the impact of potato virus varies depending on the specific variety, type/virus combinations, and time of infection.

"Virus and combinations of viruses can cause splitting and tuber deformities in some varieties. The same virus or virus combination can infect other varieties and exhibit no tuber symptoms. It's very nuanced, meaning in-depth knowledge of the variety is very important."

Graham says he's noticed an increase in PLRV in UK crops this season, whereas PVY levels remain similar to last year. "Although awareness is there, growers tend to revert to their agronomist where virus occurs. However, it's about creating a robust system which avoids virus infection in the first place which all starts with seed sourcing. The yield impacts of virus infection in some varieties can't be overlooked."

Breeding targets

With the promising developments coming through from Drummond and JHL, Graham hopes potato virus will eventually be managed through genetics and targeted breeding. Although he warns that such progress has to result in varieties that match or exceed current yields, plus deliver marketable traits such as skin finish and processing attributes.

In the meantime, he highlights the importance of purchasing input stock

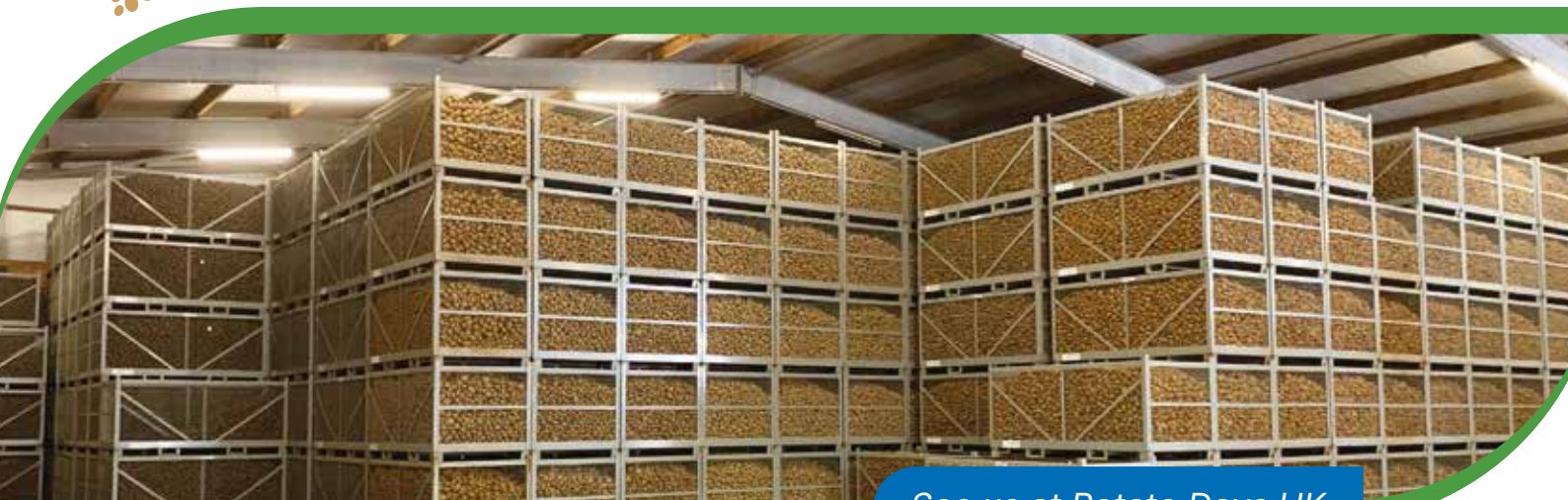


VCS' Graham Tomalin says he's noticed an increase in PLRV in UK crops this season whereas PVY levels remain similar to last year.

of the highest possible quality. "With shortages across the board this hasn't been the easiest of late, but buying seed of the lowest generation and highest certification grade is the most effective way of minimising the risk of potato



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► virus. A good long-term relationship with seed suppliers is important.

“Where I advise in East Anglia, aphid populations in most years are particularly high as is the prevalence of virus in volunteers. This makes quality seed sourcing imperative,” he stresses.

For seed growers he adds how location can add further complications, whether that be proximity to ware potato fields or the presence of volunteers in other crops being a virus source. “You also can’t risk growing near to allotments or residential veg patches. This means you’re often utilising land without irrigation which creates additional production challenges in a relatively dry area of the country,” explains Graham.

Weather constraints

But again, even when deploying tried and tested cultural control mechanisms, it’s not always simple, he adds. “Earlier planting would be a way to reduce virus impact because plants gain a level of resistance to some viruses as they develop. But of course, we’re finding this is becoming more challenging to achieve with recent weather patterns and earlier aphid flights.

“In addition to all of the above, you also have to reduce the risk of virus spreading in seed crops by using chemical control options – whether that be oils or insecticides.”

Earlier this year an emergency approval was granted for paraffin oil product Olie-H in seed potato crops, for application from tuber initiation onwards. The product works by coating the crop’s leaves with a thin film which disrupts the acquisition and transmission of virus by the aphid’s stylet.

Used alongside translaminar insecticides such as Teppeki (flonicamid) and InSyst (acetamiprid), Olie-H forms part of an integrated approach but offers a completely different mode of action, says Graham. He adds that it should be noted the use of



A potato tuber infected with a necrotic strain of potato virus Y (PVY).

Restrain PET update



Restrain has unveiled a delivery mechanism for its Precision Ethylene Treatment (PET) technology.

Manufacturer Restrain has announced the official launch of its new Precision Ethylene Treatment (PET) technology for potato stores.

As explored in the June issue of *CPM*, the company has been working to harness the power of ethylene to revolutionise potato storage and sprout prevention. Now, Restrain has unveiled a delivery mechanism for PET which introduces and maintains optimal ethylene levels in potato stores to prevent sprouting, preserve sugar levels with protection of fry colours, and minimise weight loss.

The system is based on three steps: a sensor, a dose pulse and a control management system.

1 The sensor – excludes interference from other molecules to ensure precise and continuous ethylene sensing in potato storage. It also measures carbon dioxide, temperature and relative humidity for comprehensive monitoring.

2 The pulse – this innovative low dosing

pulse system delivers controlled ethylene at parts per billion, below sensor detection levels. This prepares potatoes for higher ethylene levels while suppressing sprouting and minimising respiration to protect fry colour and reduce weight loss.

3 The control – a state-of-the-art ethylene control management system which employs sophisticated algorithms to establish and maintain precise ethylene levels in commercial storage facilities.

In layman’s terms, the system uses a ramping up system to introduce initial low doses of ethylene into the store before achieving the concentration required for sprout suppression. This ‘helps’ the potato to acclimatise to the ethylene, reducing the impact on respiration rates and therefore reducing sugar production within the tuber.

According to Restrain, the PET system represents a ‘quantum leap in potato storage solutions’.

Teppeki is restricted in many ware markets.

Graham also believes more work can be done to maximise the cultural control methods which are becoming popular in other areas, such as companion cropping. Most famed for use in oilseed rape to combat cabbage stem flea beetle, he says trial work is taking place which looks at planting a spring cereal alongside seed potato crops.

“By shielding the young potato crop, it makes it more difficult for the winged

aphid to locate the plants because they’re unable to differentiate the potato plant from the background cereal crop. This is similar to research that’s taken place in sugar beet and carrots.

“Work has also been undertaken, with promising results, looking at a similar concept with straw mulches. But I can’t see this taking off in East Anglia in the same way due to the volume of rented land and implications of resistant blackgrass seed spread.” ■



last word

by Janine Adamson

Timeworn pages

“Remember the real me when I cannot remember you” – wow, as someone who’s cared for a relative with dementia, that quote has brought a tear to my eye.

I doubt I have to justify why I’m opening up a conversation regarding this terrible disease, after all, the Alzheimer’s Society estimates there are around 982,000 people currently living with dementia in the UK.

This, coupled with the nature of our business – agriculture is a multi-generational game – means I’m certain many of you will have had some form of experience with what’s simply, a devastating illness.

My first encounter with dementia was around 15 years ago when we noticed subtle shifts in my nan’s personality. Typically a very bright, kind and tolerant individual, she became increasingly frustrated and short-fused. There were of course the obvious memory lapses, but nothing hugely significant; she just seemed a little different to usual.

Fast-forward a few years and the television remote control was in the fridge, a horse was frequenting the garden (it wasn’t) and ‘home’ was a place she hadn’t lived at for near

on 40 years. Through a change in circumstance I was living with her at the time, yet rather than her granddaughter, I’d become ‘that girl upstairs’. Where had the lady we so dearly treasured disappeared to?

Some days it would be a sheer battle of wills – us versus dementia. Yet others there’d be a fleeting glimmer of hope that the person we so desperately missed was still with us. Because that’s the worst part – dementia gradually pecks away at someone’s spark from the inside out until there’s little left but a shell.

As for my mum, who took on the lion’s share of care duties, I have nothing but respect for the sacrifices she made – the missed social occasions, the early starts and late nights, trying to stay five steps ahead, the inability to switch off. I fell in the middle, helping out where I could around my job plus desperately not wanting to add to the burden in any way.

Yes we had carers and medical support, but in a bid to enable nan to keep her home (and what was temporarily my home), we had to seriously lock in.

For me, the worst part is the confliction. Dementia tests every fibre of your patience – it feels personal. You have to be incredibly strong willed and remember it’s the disease talking not your loved one, even through the tears, tantrums and lost back door keys.

Life becomes nothing but repetition on so many levels – being asked the same question 10 times over, listening to the same tale (which you’re unsure whether is fictitious or not), and playing out the same

moves week in week out, in a bid to maintain routine.

Then there are the huge waves of guilt after perhaps a raised word or having had a negative thought towards them. But enduring love keeps you going, it becomes an honour to defend their dignity and try to protect them from this thief of minds.

Finally there’s grief. You deeply mourn the person you once knew as they slowly ebb away in front of your eyes. You crave having a ‘normal’ conversation or to seek their sage advice.

A few months after I’d vacated my nan’s guest room, the decision was made that the time was nigh and we should seek residential care, for safety reasons primarily. There had been very close calls with the gas stove, for one. However, in what became a strange twist of fate, my nan was diagnosed with terminal cancer and passed away just three weeks later.

Dementia is cruel for all

involved yet I keep going back. Not only is it the turn of my paternal grandmother, but I’ve also chosen to volunteer as a community befriender for the elderly. Once a week I visit a lady who has Alzheimer’s (a form of dementia) to keep her company and relieve a little of the pressure I’m sure her family is enduring.

For you – our readers – I can’t begin to imagine the magnitude of dealing with what’s been a misery-laden season, plus potentially having to care for elderly loved ones. These are family members who’ve no doubt given their all to the farm, been integral in its making and whom you love dearly. It must be crushing.

But as that opening quote suggests – try to concentrate on the person beyond the dementia and when it’s the disease speaking, it’s often not the truth. Finally, in all of this, remember to be kind to yourself – you matter more than ever. ■



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