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Is early drilled wheat worth it?

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Volume 26 Number 7
July 2024



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*the claim 'best read specialist arable journal' is based on independent reader research conducted by McCormack Media 2020

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CPM Volume 26 No 7. Editorial, advertising and sales offices are at CPM Ltd, 1 Canonbury, Shrewsbury, SY3 7AG England.
Tel: (01743) 369707. CPM is published eleven times a year by CPM Ltd and is available free of charge to qualifying farmers and farm managers in the United Kingdom.

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Editor's Pick

I'd love to open up this issue with something politically profound, but I have to admit, the recent general election has left me feeling even more anxious about what the future may hold for both UK agriculture and society as a whole.

In a very simplistic term, there wasn't anyone 'decent' worth voting for (that would actually count). I believe we were distinctly missing the good from 'the good, the bad and the ugly'! But I made sure I did my duty; most worryingly, my husband and I were the only people at the polling station despite it being within peak hours.

My biggest concern is around intention – just because something was in a manifesto doesn't mean it will actually happen in reality, including the good. Just like the boyfriends from my early twenties, once you're reeled in, politicians seem to change their minds at the drop of a hat regardless of the consequences.

Anyway, given I've little useful to say on the matter, other than to whisper it's okay to feel a bit meh, I'll move conversations swiftly on. So, July CPM – hopefully you'll agree that we've curated a cornucopia of content for this issue, a substantial part of which is dedicated to events coverage (Groundswell and Cereals) which starts on page 52.

Love them or hate them, for some, trade events are the sole opportunity to travel away from the farm, meet up with friends, and hopefully pick up a useful nugget or two along the way. And in the case of Groundswell festival, it likely won't surprise you that I didn't choose to camp – my back just can't hack it.

Then on page 29, something which many will no doubt be pondering, is whether to sow wheat early or not... cue a sharp intake of breath! Given the past season, it's

understandable that the temptation will be strong so we look at a variety which can support the early drilling slot.

Drum roll, please – it's not very often that I'm able to present a new writer, but I'm delighted to introduce freelance journalist, Tom Woolman. A Harper Adams graduate, Tom has taken a dive into the world of viticulture as part of our alternative cropping series (page 40). Given his usual remit is poultry and sometimes machinery writing, it's evident Tom has a natural flair for this kind of gig and we very much welcome it.

Sticking with the theme of something different, Melanie has turned the world of balers on its head to explore the critical topic of plastic use in agriculture (page 68). And in the same vein, Charlotte shares an alternative perspective on storage – the preparation/separation of intercrops (page 72). I'm conscious to try and add a little spice to this section of CPM and hope these stories hit the mark for our readership.

Heading into Roots, a story which has certainly made me think is that on page 76 – who should be responsible for controlling volunteer potatoes in cropping rotations? Industry figurehead, Eric Anderson, shares his thoughts which will hopefully get the cogs whirring, and not just those in my head!

To round up, we share the results of our latest survey which was delivered in conjunction with Limagrain. To undertake this, CPM digital subscribers were asked to share their views on Smart sugar beet and the Conviso system – you can read the data break-down and commentary on page 80.

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smith's soapbox

by Guy Smith



same time, I'd readily confess to being not much wiser or cleverer about bringing home a harvest than I was when the Bay City Rollers were in the charts.

It's interesting that my late father could also make this half a century claim, but the changes he witnessed were more fundamental than the ones I've seen. Starting in the 1930s, Dad would have taken part in summer-long harvests involving binders, stooks, cart horses and pitchforks culminating the following winter with steam-powered threshing machines and hessian sacks.

It's a world away from the modern harvests dominated by the utility and capacity of the combine harvester. Admittedly,

during the last 50 years I've witnessed a huge scaling up of the machinery involved, but the technology and the concept are much the same. Similarly, Dad would have seen a tripling of crop yields whereas for me, it's been nothing like that rate of increase.

One of the initial harvests I witnessed first-hand was 1984 when we achieved a wheat yield of 10t/ha across the farm. Given the state of this year's crops I'll be delighted to match that that 40 years on.

This year's harvest will follow some one of the roughest growing years I can remember. Accordingly, my expectations of Harvest 2024 are positively mediocre. Given what some of the wheat has been through since October you could describe it as suffering from PTSD.

Such is my desperation to find a silver lining this year I'm hopeful my milling wheat yields will be low enough to achieve decent proteins. Given we mainly have milling wheat in the ground, the current healthy premiums are probably my one chance of profit this year. Choosing to grow milling varieties has served us well in recent times, but given the battle with rust we had with Crusoe, I'm not inclined to grow it again.

The problem is what to grow in its place? I'm minded to have a look at SY Cheer or RGT Goldfinch, but I'm wary as to how the millers aren't guaranteeing they'll pay full Group 1 premiums for them.

So I'll sign off by wishing you an easy and profitable harvest. Maybe, just maybe, given the contrary weather we've suffered during the past 10 months, we're now due a hot dry harvest rather than it continuing in the same unhelpful vein.



Herewith a photo of one of this year's curiosities - a self-combusting bale. I've heard of such before but never witnessed it first-hand. In the past, on hearing of such phenomenon the cynic in me used to wonder if such alleged natural phenomena were actually the result of careless discarded fags or boys with matches or, heaven forbid, bogus insurance claims. However, the sight of smoke from a bale of whole wheat silage taken because of a heavy blackgrass infestation, made me realise how very real spontaneous combustion is. When I first saw it from my bedroom window I thought it must be a trick of the light, but closer inspection showed the bale had indeed chosen self-immolation. The sappy wheat straw generated the heat and the blackgrass acted as the tinder. It's nice to still come across little pieces of farming wonder I've never witnessed before.

A PTSD-conditioned harvest

I once read that to claim to have lived a full farming life, a farmer should see first-hand at least 50 harvests. I'd guess I'm far from alone in that given I was handed harvest jobs in my mid-teens, and I'm now in my mid-sixties, I can smugly claim to have now lived a full farming life. At the

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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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“If these cousins of take-all enter into the roots first, they stop the take-all fungus getting in; we call it the family feud.”

Avoiding the take-all trap

Seed treatments

Wet weather, mild temperatures and high grassweed burdens this season are set to boost the build-up of the take-all fungus in soils. *CPM* digs deep into the latest research to find out more.

By Rob Jones

Take-all is considered the most important root disease of wheat worldwide reducing yields by up to 50% in high disease pressure situations, yet options for its control are limited.

With silthiofam in seed treatment Latitude – the only fungicide currently available for use against the disease – and limited varietal tolerance, it means rotational strategies combined with later drilling dates are essential for take-all management.

However, considerable progress is being made in the understanding of take-all, aided by the application of molecular techniques to study the fungus alongside developments in crop genetics and soil microbiome analysis.

Following recent work on the genetics and genomics of the take-all fungus, scientists are hopeful that a fungal ‘family feud’ may provide a route to

limiting the impact of this often hidden disease of cereals.

And this is particularly prevalent because this season is already on track to be one in which levels of take-all inoculum and infections will build substantially, although how much damage the disease inflicts on root systems and final yields will depend on weather conditions through to harvest.

High-risk conditions

Take-all symptoms were starting to appear in trials at Rothamsted Research in Hertfordshire in mid-June, says Dr Kim Hammond-Kosack, a molecular plant pathologist at the institute.

Last autumn’s wet weather followed by a mild winter and wet spring – a weather pattern seen with increasing frequency – represent a high-risk combination for take-all development in soil and subsequent root infections, explains Kim.

She draws a comparison with the 2021-2022 season, which saw high levels of take-all, although disease symptoms came in late and were masked by crop senescence during a hot spell later in the summer.

“Most farmers didn’t see the take-all patches even though the disease level was up at 80-90% that year. This year, if the cooler weather continues, they’ll perhaps see a little height depression in their crops but possibly not a proper take-all patch,” says Kim.

Climate change is expected to increase take-all risk in areas where autumns and winters become milder and wetter. Studies at Rothamsted have compared the effects

of different weather patterns and extreme weather events on take-all infections and disease severity across several seasons.

The take-home message from these studies is that warmer, wetter winters and milder, wetter springs followed by any type of summer weather – including extreme heat – can increase take-all infections and disease severity, says Kim.

Further research underway at Rothamsted is focused on crop genetics, including screening for new sources of resistance. One line sourced from the 1930s A. E. Watkins collection of wheat landraces – Watkins 777 – has been



Last autumn’s wet weather followed by a mild winter and wet spring represent a high-risk combination for take-all development, explains Dr Kim Hammond-Kosack.

evaluated under field conditions and found to display good root resistance to take-all under moderate and high disease pressure in a third wheat situation.

Tall and low yielding, Watkins 777 isn't a commercial cultivar and so was crossed with spring wheat Paragon to produce a biparental mapping population used to map the genetic regions associated with disease resistance at specific locations in the wheat genome.

"We now have one very large QTL (quantitative trait loci) – one region of the genome – where it seems this resistance resides. We have markers to each side of this QTL and as we narrow this interval, the exact genes conferring resistance can be revealed, while commercial breeders can start to use the original diagnostic markers to cross the new trait into elite wheat breeding programmes.

"That'll mean the Watkins 777 resistance should end up coming into commercial varieties as an introgression in about five or six years' time," suggests Kim.

Another area of research, which she admits to being 'very excited about', is work on the genetics and genomics of the take-all fungus family. This has revealed that *Gaeumannomyces tritici* (*Gt*), the fungal pathogen responsible for take-all infection, has a non-pathogenic relative *Gaeumannomyces hyphopodioides* (*Gh*), which is unable to penetrate through to the root cortex. And, unlike *Gt*, doesn't cause damage to roots.

According to Kim, infection of roots with *Gh* has been shown to be beneficial in reducing take-all infection. Although why this happens isn't clear, it appears reduced infection may be correlated with up regulation in several defence genes.

"If these close cousins of take-all enter into the roots first, they stop the take-all fungus getting in; we call it the 'family feud'," says Kim.

Sequencing the genomes of



A line of take-all resistance has been sourced from the 1930s A. E. Watkins collection of wheat landraces.

Gt and *Gh* strains will enable analysis of the populations of each fungus in soils using genetic markers. Ultimately, it may be possible for growers or agronomists to conduct a simple diagnostic test to identify which fungus is present which could help inform rotational planning.

On farm, the take-all thread runs through several facets of agronomy, including rotation, drilling date and grassweed burden, each of which require consideration as new season plans are shaped.

But it's likely rotations have been severely disrupted this season with the expectation of a considerable quantity of held-over seed available, together with questions around the viability of break crops whereas a swing back into winter cereals and wheat in particular, is anticipated.

The legacy of the difficult 2023 autumn is also expected to compel growers to drill earlier which will only exacerbate the take-all risk, says Agrii's David Leaper.

As always, much depends on the weather – should conditions remain relatively damp, take-all inoculum will continue to build and there's a risk winter cereals will be drilled into a high inoculum base, he says. ▶



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▶ “The weather has implications not just for the current season but also in terms of what the impact of take-all could be next year. This pattern of wetter soils and warmer temperatures means we’re getting a big take-all build.

“If you drill earlier, whether it’s first or second wheat, it’s going to have an implication on the dynamics of take-all; your take-all build is going to be exacerbated,” he warns.

Close to 15% of the winter wheat seed sold by Agrii is treated with Latitude, adds David. “It’s far from a niche treatment and it does show the commitment to second wheats – there’s quite a hectareage out there,” he says.

Bounce back

While second wheat plantings for Harvest 2024 were hit by last autumn’s wet weather and difficult drilling conditions, the area is likely to recover to more typical levels for Harvest 2025, he suggests.

“If growers were struggling to drill first wheat last autumn, then they were definitely struggling with second wheat. I suspect the second wheat area will probably bounce back to where it was previously,” adds David.

Currently, as the only chemical option for use in take-all management, Latitude should be used in conjunction with cultural approaches, encompassing tillage, rotation, drilling date, crop nutrition and variety choice in an IPM approach to disease management.

With cultivations, it might be expected that reduced tillage would lead to increased levels of take-all because seedling roots are in close contact with debris from the previous crop, but the reality is the additional consolidation afforded by a direct drill or min-till approach is beneficial, says David.

“A lot of the work that came out of the Arable Research Centres back in the 1990s showed that one of the worst



David Leaper says the weather has implications not just for the current season, but also in terms of the impact of take-all for next year.

things to do [in creating favourable conditions] for take-all is to open up the soil and introduce a lot of air. Consolidation in itself is quite good.”

Certain grassweeds including ryegrass provide a host for the take-all fungus, contributing to the build-up of inoculum, while blackgrass has only a minimal effect on build up other than the fact it influences drilling date and rotation.

Indeed blackgrass, much in evidence this season, is likely to be the main driver when it comes to bringing rotations back on track this autumn, suggests David.

“Where you have blackgrass on the farm your rotation is driven by it: what you drill, when you drill, and how you manage the crop. That almost moves you out of the traditional approach to rotation.

“The reality is we’re going to have to live with a more fragmented approach to our rotations, especially where we have ryegrass or blackgrass on the farm, or indeed, if the climate is dictating what fields you can cultivate and drill.

“I think farmers are quite resilient and as long as they have the right information on the right varieties, to put in at the right time and manage them to cover their weaknesses, they’ll ▶

Promising Bacillus

Improved germination rates, vigour and nutrient acquisition are among the benefits of a biological seed treatment for winter cereals, developed by British crop inoculant specialist, Legume Technology.

Research led by company founder Dr Bruce Knight suggests Bacillus can also relieve biotic and abiotic stress, such as the waterlogging that plagued this year's crops.

Bacillus has long been recognised as a 'plant growth promoting bacteria', says Bruce. "But with more than 300 species identified, research is only just catching up with the interest in biological inputs.

"Our Bacillus research began in 2017 with trials conducted with PGRO. We added it to our standard rhizobium inoculant to compare it with third-party biostimulant seed treatments such as folic and humic acids, and our own mycorrhizal products."

Bruce says the trials intended to identify 'over and above' benefits of additional treatments. While biostimulants and mycorrhiza showed some improvements, Bacillus was 'astonishing', he says.

"Calculating return on investment, we saw figures of £11/ha and £20/ha for the biostimulant and mycorrhizal treatments respectively. But Bacillus was streets ahead with ROI of £52/ha."

Subsequent analysis of plants from the trials show those treated with Bacillus displayed stronger lateral rooting and greater root mass. Evidence of this effect – and later improvements to the pea product, increasing ROI to £187/ha – prompted the research deployment in cereals.

"Many studies showed how Bacillus increased bioavailability of nutrients such as phosphate," notes Dr Mike Thomas, Legume Technology's research and



In seed treatment trials, while biostimulants and mycorrhiza showed some improvements, Bacillus was 'astonishing', says Dr Bruce Knight.

development manager.

Taking this knowledge into early glasshouse trials at the University of Nottingham, Bacillus strains were compared with conventional, chemical treatments to assess effects on low temperature germination of wheat. "We anticipated improvements but results were better than expected," says Mike.

"All treatments reached similar germination rates of 98-99% by day eight, but Bacillus-treated plants were always forward, outperforming mainstay treatments such as fludioxonil to reach maximum germination fully two days ahead."

Mike says agronomists extrapolate glasshouse data by a factor of 3-5, so a two-day glasshouse improvement means a difference of up to 10 days under field conditions.

Now, field-scale trials have confirmed the early research – Bacillus-treated winter wheat produced 0.6t/ha over conventional seed treatment, potentially at least 7:1 ROI, if pricing for the product – known as ROOTFIX – is as anticipated at around £15/ha.



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According to Adam Nears, high populations of grassweeds in break crops and spring crops this season will carry over take-all inoculum.

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pull their rotations around quite quickly," he says.

One aspect of take-all management that's possibly overlooked is the impact of challenges arising outside of cereal crops, comments Certis Belchim's Adam Nears. "We're seeing an awful lot of grassweeds in break crops and spring crops this season and they're going to carry over take-all inoculum.

"That elevates the risk for crops going into the ground this autumn and I think the danger is while growers understand that in a second or third wheat situation take-all is a factor to consider, what will catch them out is that break crops or SFI options haven't been clean and won't have been a true break," says Adam.

He believes an early start to the autumn 2024 drilling campaign is almost inevitable but highlights Latitude's value as a tool in managing drilling dates. "We always see after a very wet autumn that drilling gets pulled forward by a week to 10 days the following year but, in these situations, days really do matter, whether in blackgrass control or take-all risk," he says.

Bringing drilling forward with unprotected seed will elevate the take-all risk, but Latitude can be used to help manage the drilling window and offset that risk, he adds, possibly

even in a first wheat where grassweeds haven't been well-controlled in the preceding break crop or where the field has a history of take-all.

"I'd have no hesitation in advocating the use of Latitude in a first wheat situation where grassweeds haven't been controlled and where there's the opportunity for inoculum to build up," says Adam.

Budget considerations

With a typical yield response of 0.2t/ha from Latitude use in a first wheat situation, compared with a more typical 0.55t/ha in a second wheat it is, however, important first to consider how wheat is being priced in the budget, he adds.

"If you've forward sold wheat at £210/t plus a £60-70/t milling premium, then 0.2/ha is probably worth chasing economically. But if we're talking about basic feed wheat at £190/t, perhaps even £160/t if you sold some back in March just to get something on the books, then you have a very different equation.

"You have to think about your market and what the value of your wheat is going to be, what the take-all risk is and whether Latitude is going to give you an economic return on investment, and to help with that we have the Latitude Cost Benefit Calculator for growers to use," concludes Adam. ■



“It’s all about establishing crops so they can grow away and get to a position where they can cope with whatever the weather throws at them.”

Supercharging soils

Pushing Performance

Two years on from our last visit, *CPM* catches up with Overbury Enterprises’ Jake Freestone to find out about his latest endeavours to ‘supercharge’ soils.

By Charlotte Cunningham

Long-standing readers of *CPM* will be familiar with seeing Jake Freestone across the pages of the magazine...

A true innovator in the world of regenerative farming, Jake is perhaps best known for his passion for soil biology which he applies to the mixed soil types at Overbury Enterprises via his role as farm manager.

“Overbury Enterprises is a mixed farm made up of three main soil types: Cotswold Brash, sand over gravel, and Hanslope clays. The farm in total is about 1600ha and has been in the same family since 1723.”

The arable enterprise makes up one of the business’ divisions and is set over 850ha, with an additional 200ha combined on a neighbouring farm on a contract farming agreement.

Cropping wise, the farm grows Group 1, 2 and 4 wheats, winter and spring barley, oilseed rape, winter beans for seed and some linseed. “We also let out

a small acreage every year for vegetable production and grow broccoli and beetroot,” says Jake.

The rotation also comprises grass, GS4 and AB15 area, as well as SAM3 herbal leys under the new SFI scheme. “With the SAM3 grassland, we’ve been working in partnership with a local dairy farmer to produce silage for them with a view to grazing sheep on the aftermath of that.”

Consistent approach

When it comes to the farm’s ethos, while Jake may be keen to experiment with new innovations and technologies, his farming philosophies very much stay the same year-on-year. “We’re all about regenerative agriculture – integrating our livestock into our arable fields as much as we can and trying to focus on improving soil health.

“We’re doing that through direct drilling, cover crops wherever we can, some clover understory and living mulches and building organic matter. Much of this focus around soil health is linked to the target of reducing our artificial inputs – both in terms of pesticides and fertilisers.”

But this is a long-term game, says Jake, which is all building towards protecting the farm in the future. “We’re getting a lot of variability at the moment, but that variability is very inconsistent. If we look at this year, for example, springs up until now have been very dry and we’ve seen the total opposite this year.

“A lot of what we’re doing now is about risk management – keeping fields covered is definitely part of our philosophy. If we’re

in a wet spring, we have photosynthesis happening, plants using water, and roots being pushed down in the soil. So even if we can’t get on the field to plant, the biological function is constantly going. When it’s dry, cover crops help to shade and keep a little bit more moisture in the soil.”

Despite best efforts, Jake believes what he’s doing now still isn’t fast enough to cope with the pace of change. “I was a bit despondent in the winter when I looked at some of our fields and saw how wet they were as I felt we should have had better water infiltration. But even those fields,



It’s all about the soils, believes Jake Freestone, who says if you can get that right, everything else will fall into place.



Overbury's ethos revolves around regenerative farming – integrating livestock into arable fields and trying to focus on improving soil health.

▶ structurally there's nothing wrong with them – they just physically couldn't take that amount of water. That said, I think even if we were in a cultivated system, we wouldn't have fared any better.

"We're on the right track, but I worry our speed of change isn't fast enough and I know that will freak out an awful lot of farmers because many don't have their heads around the need for change at the moment. We've been doing this for 10 years and we're not going fast enough. I guess the golden question is: how can you super charge soil health and resilience? It's all about the soils – if you can get that right, everything else will fall into place."

Establishment focus

Building on this, to foster both health and resilience, crops in the ground must be well managed from day one to achieve that onward health, believes Jake. "It's all about establishing them in a way which means



Newton-treated plants had more biological activity in terms of how the soil was sticking to the roots this autumn.

they can grow away and get to a position where they can cope with whatever the weather is going to throw at them."

As far as what that means practically, as well as being sown into good soils, a robust rooting system which allows crops to mine nutrients and water – and adds structure – is key, he believes. To aid this root development, Jake has been trialling a biostimulant seed treatment – Newton – from Interagro this season.

"Stimulating plants to thrive from day one is crucial for addressing the challenges posed by climate change, ensuring food security and promoting sustainable agriculture," says Stuart Sutherland, technical manager at Interagro. "Optimising plant health from day one – by boosting seeds rather than treating plants – is key to building resilience in crops and agricultural systems.

"During the past five years, UK farmers have experienced more frequent and severe weather events, such as droughts, heatwaves, floods and storms, challenging plant health at key points in the growing cycle. Variability in weather patterns has become more common, making it difficult to predict optimal planting times and manage crops effectively."

All of these factors add pressure on yields and profitability, he continues. "While they may not directly impact climate resilience, biostimulants applied to the seed are becoming increasingly valuable components of a broader strategy for building stronger, healthier more resilient plants better able to cope through the entire growing cycle."

So what exactly is Newton and how does it work? Based on plant-sourced signalling peptides, Newton is a natural eco-friendly alternative to chemical seed treatment which stimulates plants to thrive naturally,

explains Stuart.

In the field, this stimulation results in quicker germination, leading to faster, more consistent emergence, as well as more vigorous early growth. It also helps crops enhance their natural resilience by signalling plant defence systems early in the life of the plant and by putting down better root systems, he adds.

"In fact, it's the extraordinary rooting benefits of Newton what really helps set it apart from other biological seed treatments, and fosters improved soil health," continues Stuart. "By stimulating an expansive root system Newton improves the nutrient use efficiency of plants and really helps in times of drought and provide better frost heave resistance. This we have seen in trials and heard from farmers.

"In terms of the benefits this brings at the business end of the season – harvest – Newton has been proven in trials to increase yields by up to 10%. In seasons like the one we're in, where there has been limited opportunities to support plant health during the season, supporting seed health is the best time in the growing cycle to protect yield potential and make every seed count."

But how has it fared so far for Jake? "We've tested Newton in split field trials this year and emergence was a little bit quicker compared with untreated. The Newton-treated plants also had bigger roots with more biological activity in terms of how the soil was sticking to the root," he explains. "In November/December time this difference was very evident. We'll take them to yield and see then if there are any differences in overall production



Stimulating plants to thrive from day one is crucial for addressing the challenges posed by climate change, ensuring food security and promoting sustainable agriculture, says Stuart Sutherland.



A robust rooting system which allows crops to mine nutrients and water – and adds structure – is key for cultivating resilient crops.

with the Newton.”

While the trial plots look fairly similar in their growth habits at present, Jake believes it'll be the marginal cases which actually make for the biggest overall benefits. “In marginal scenarios, the differences in better rooting, brought on by Newton, might make all the difference in a crop surviving or not.”

Newton isn't Jake's first look at biological solutions – in fact, he's been using liquid seed treatments and biological brews for the past four years. “We also haven't been using fungicidal seed dressings for about five years – other than in some seed crops we buy in,” he says.

“We treat with manganese and zinc as a seed dressing and that's about it. I haven't had a year yet where we've decided to go back on this decision. This is all because we want to create a fungal environment in the soil – we don't want to be putting fungicides in the place where we want to be getting fungi and the plants to talk to each other. If I knew then what I

know now, we'd probably have done this from the start.”

Biostimulants are also used throughout the season and carbon sources go in with all fertiliser applications to ‘even out the impact’ on the soil life from all of the nitrogen, says Jake.

“But above all else, having something to start crops off well is really important to help them get up and away. This is where Newton fits in well and works alongside our ethos of managing our plants from day one.

“The plan is to use Newton again this coming season across a bigger trial area and analyse its full potential in more detail. Hopefully we'll have a more ‘normal’ year – whatever that is – which will help us to get some good quality data,” he jests.

Future-proofing

In terms of other plans for the future, both short and long term, Jake says being able to remain farming and profitable is the main thing. “We're

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3

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Improvements to soil health are being made via direct drilling, cover crops wherever possible, some clover understory and living mulches and building organic matter.

▶ actually taking delivery in July of a compost windrow turner, which is partially funded through the FiPL (Farming in Protected Landscape) scheme, so we're going to ramp up our compost manufacturing capabilities – again, to replace nutrition via organic sources.

“The aim is that this will help us to further reduce our reliance on bought-in fertiliser and in turn, lower our carbon footprint. At the moment our nitrogen inputs contribute

to 52% of our farm carbon footprint and we want to work on this.

“In 10 years' time, I'd like to see our organic matter up by another percent – that would be a huge achievement. I also have the ambition that we'll be able to sell and be rewarded for regeneratively farmed produce. I think there's a huge opportunity to do this but will rely on us pooling on the tools available to help us farm as efficiently as we can.” ■

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.



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“There’s definitely an underlying trend towards more brome thanks to changes in management techniques.”

Battling brome

Brome is proving an increasingly difficult weed to control with populations of all species reportedly on the rise. CPM brings together stakeholders from across the industry to discuss, as part of this month’s Real Results Roundtable.

By Janine Adamson

With last season coined ‘the year of the grassweed’, plus the added pressure of continued inclement weather conditions all spring, where does this leave growers as they begin to plan their autumn herbicide strategies?

For this Roundtable, CPM brings together NIAB’s weed biology and management specialist, John Cussans; BASF’s cereal herbicide business development manager, Stuart Kevis; BASF’s agronomy manager, Jennifer Deakin; and Colin Woodward, agronomist at the Great Tew Estate in Chipping Norton.

Colin oversees around 1350ha at the estate involving a rotation of winter wheat, winter and spring barley, oilseed rape, winter and spring beans, spring peas

and spring oats. This is across three main soil types – Cotswold brash, clay and Ironstone loam.

Great Tew has countryside stewardship and SFI agreements in place to protect and enhance the environment – all arable fields have 6m margins and more trees and hedgerows are being planted. Organic matter is added to the soil with compost, biosolids, cattle muck and through cover cropping.

The discussion for this Real Results Roundtable is understanding the nuances of brome control.

Current state of play

John opened up discussions by explaining that similar to wild oats, brome is often in a state of flux – in some years pressure seems to skyrocket, whereas in others, the weed almost disappears. “Last harvest was one of those years where brome was everywhere with all of the different species at very high abundance.

“That said, there’s definitely an underlying trend towards more brome thanks to changes in management techniques such as a reduction in ploughing alongside perhaps shifts in herbicide use driven by other concerns. It’s a group of species which undoubtedly requires a renewed focus and from my perspective, that includes revisiting the weed biology information which we may have taken for granted,” he said.

He then reminded of the importance of understanding the two groups – anisantha (sterile and great brome) and serrafaculus

(meadow, soft and rye brome) – and how their behaviour, and therefore control methods, differ.

“The anisantha-type brome are autumn germinating weeds so we can draw parallels with blackgrass, where most will emerge with a crop so have the potential to be very competitive. In fact plant-for-plant, sterile brome is slightly more competitive than blackgrass.

“Whereas for soft, meadow and rye brome, these individuals come up from when you drill the crop in winter right through to the spring. Although the weeds which emerge in spring are less competitive, they do keep the population ticking over.”

John pointed out that for scenarios where ALS resistance is developing, NIAB has been focused on how to control spring



Last harvest was one of those years where brome was everywhere with all of the different species at very high abundance, says John Cussans.



For meadow and rye brome control, Stuart Kevis believes there should be a zero tolerance approach whether that's through spraying off patches, hand-roguing or mechanical weeding.

▶ germinating brome due to the lack of effective contact-acting herbicides. “For a weed which germinates partly in winter and partly in spring, you just can’t target it sufficiently with the herbicides which we currently have,” he said.

Colin agreed that this is a specific problem at the Great Tew Estate. “Meadow and rye brome generally germinate for us in November through to February, and because we can only apply Avadex (tri-allylate) at pre-em, that runs out of steam by the time the brome are germinating. We only tend to see sterile brome where we’re direct drilling,” he explained.

In terms of this season specifically, Colin raised the potential implications of SFI. Whereas some actions such as legume

fallow (NUM3) and herbal leys may help contribute to successful brome control, others such as enhanced over-winter stubble may hinder.

In response, John said it’ll be a case of finding the sweet spot to ensure actions are delivered correctly, without adversely having an impact on weed management. “Afterall, set aside led to a proliferation of weeds,” he commented.

Seedbed management

Conventionally, advice has been to cultivate as soon as possible after harvest for sterile and great brome because shallow burial promotes germination, explained John. For soft, meadow and rye brome, seed should be left on the soil surface to encourage germination and prevent dormancy.

However, he questioned this school of thought. “Preliminary data from NIAB’s brome survey, which was carried out last summer, begins to bring into question whether that should be a hard and fast rule for every population every season.

“I think we should probably move to a situation where we advise people to respond to conditions post-harvest – if they’re conducive to getting grassweed seeds to germinate, you do a bit of work to increase soil-seed contact whether that’s shallow cultivation or even a roll. If it’s dry or dusty, you leave the seed on the soil surface because anything you do will actually protect them from those conditions.

“I think there’s a lot more work to be done here because we’re finding different populations respond differently, and we

don’t quite understand how that interacts with the season-to-season difference in weather patterns,” he explained.

ALS resistance

Perhaps concerningly, John shared that ALS-resistant strains of rye and meadow brome are being regularly reported, which was shown during NIAB’s resistance testing last year. “We’re certainly seeing an uptick in the occurrence of ALS resistance in all brome species, and where we’re seeing new cases, they’re often clustered together.”

John explained that the reason for this could be biology-related. “Meadow and rye brome mature relatively late and are more synchronised with the crop. They’re quite aggressive at keeping their seeds even through harvest which makes for a bio-security issue – incidental movement of farm machinery – so we’re physically moving seed around the local area.

“It’s hard to target something if you think it’s ALS-resistant, so the message about this group of brome species is you have to be vigilant about new populations and ramp up bio-security measures,” he stressed.

Stuart concurred: “In many ways, for meadow and rye brome, there should be a zero tolerance approach whether that’s through spraying off patches, hand-roguing or mechanical weeding. That’s because in terms of chemistry, there’s nothing which can fully do the job,” he said.

Cultural methods

Colin suggested he was interested in the concept of harvest weed seed control (HWSC) such as the Redekop Seed Control Unit (SCU). John said this was something which NIAB had been investigating as part of work with BOFIN (British On-Farm Innovation Network).

“When you look at the different weed species, really how effective seed mills are is related to seed retention,” he continued.

“But what we found is that we can achieve 70% reduction in the following crop in brome, whereas it was barely 5% in a weed like blackgrass. It’s obviously related to seed biology.”

This reminded Colin of something he has witnessed at Great Tew. “I’ve noticed the space between the grass margins and the crop – brome love it there. Of course then, the combine naturally picks the weeds up and then disperses them so brome can creep further into the field. That’s another watch-out from SFI – cleanliness between margins and the crop,” said Colin.



According to NIAB, ALS resistance is being observed across all brome species.



The BSBI monitoring scheme indicates the plant species which has increased the most across the British Isles is rye brome.



Having used Luximo for two years, Colin is impressed with its performance so far.

John then highlighted the importance of wider cultural control methods such as optimising cropping rotations and the role of resistance testing. “Knowing where you sit is quite important,” he advised.

Chemical control

As earlier discussed, Colin currently uses Avadex as part of his brome control strategy, while also using prosulfocarb (as in Defy), and then ethofumesate (as in Xerton) at post-em.

But an alternative option, as highlighted by Jenny, is Luximo (cinmethylin). “In a more conventional drilling scenario where you might be going late to target blackgrass, you will see a good level of activity from Luximo on sterile and great brome,” she said.

Stuart added that although the active

was launched primarily to control blackgrass and ryegrass, BASF has re-evaluated this in acknowledgement of the threat of brome. “Data suggests Luximo can perform as good as a flufenacet-based programme at pre-em for sterile brome control.

“We have a reasonable number of data points to confirm this is the case for autumn germinating brome species which appear early,” he added.

Furthermore, Stuart says brome is becoming a greater focus when screening new active ingredients to bring to the market. “But as with all of these options, stacking or mixing in sequence, including Luximo, should prove a solid approach.”

Colin recalled the days when Atlantis (mesosulfuron+ iodoflufenacet) provided good control of brome as part of blackgrass programmes. “Of course now it’s no longer that effective on blackgrass, so we use contact herbicides to target the brome, ryegrass and wild oats,” he said.

Having now used Luximo for two years, Colin is impressed with its performance so far. “It’s a step-up from flufenacet in terms of tackling blackgrass, in fact, it’s my go-to pre-em. You just have to show it some respect because it’s a powerful tool.

“But hearing that it also has some action against brome is certainly reassuring,” he pointed out. Colin then raised the fact Luximo can be used post-em too. “If the conditions are difficult for the weeds to germinate at pre-em, whether that’s due to stone content or in an open seedbed, you do have that option.”

A broader issue

Brome abundance isn’t just rising in agriculture, suggested John. “There’s definitely something happening beyond farming. If you look at the BSBI monitoring scheme, which is a survey conducted by botanists across the British Isles, one of the species which has increased the most is rye brome. There’s also been a substantial increase in great brome too.

“So it seems uncropped land is becoming a reservoir for brome. Ultimately, there’s been a shift – a combination of changing climate, the way we’re farming and how we’re managing non-cropped land,” he said.

Colin agreed that during the past 25-30 years that he’s been farming, he’s never seen such high levels of rye brome before.

Whereas for Stuart, he’s keen to simply raise the profile of brome. “It’s a complex problem and certainly one which growers are seeing far more of,” 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.



The AHDB logo is displayed in white text on a dark blue background. It consists of the letters 'AHDB' in a bold, sans-serif font, with a stylized white wave graphic underneath.

*from theory
to field*

Scoping reviews into reducing inputs in Recommended List trials have left AHDB with tricky decisions. CPM finds out more.

By Mike Abram

How do you design a Recommended List system that allows both the identification of varieties with the best genetic performance, and at the same time, varieties which perform best under more realistic farm practices?

That's the conundrum for AHDB as it aims to provide relevant information for an industry that's being incentivised by policy makers to change practices, including using reduced inputs, while simultaneously finding itself increasingly scrutinised about whether it's providing value for money to levy payers.

Trying to meet those potentially competing objectives is a key focus for the levy board's RL team, as the tool reaches its 80th birthday.

For much, if not all of its 80 years, the RL trials have been focused on identifying varieties with the best genetic yield potential. That's meant limiting the influence of factors which may hold back that potential – especially disease or a lack of nitrogen.

But the 2022/23 review of the RLs, which attracted more than 900 responses from levy payers, identified a demand for data that reflects the performance of varieties in situations closer to on-farm practice, rather than the 'belt and braces' fungicide and non-nitrogen limiting fertiliser programmes used in RL trials.

RL changes afoot?

“Automatic entry based on yield alone is no longer possible.”

“Growers highlighted they were looking to use lower amounts of nitrogen on crops especially wheat, and improve nitrogen use efficiency,” reports Paul Gosling, who leads the RL project for AHDB.

“Levy payers were also increasingly questioning our fungicide programmes in the trials, which are designed to exclude disease as much as possible.”

Those concerns led to AHDB commissioning two scoping reviews to examine whether there's evidence that reduced inputs change the relative performance of varieties.

Measuring NUE

A key finding from the nitrogen scoping review is the high level of complexity associated with nitrogen use efficiency and its measurement, but evidence of differences in the relative performance of varieties at relatively low nitrogen rates is mixed.

In peer-reviewed literature there's strong evidence supporting varietal differences in winter wheat performance under different nitrogen regimes, it suggests.

However non-peer reviewed AHDB, DEFRA or industry trials consistently show varieties released at a similar time don't differ in various nitrogen use efficiency metrics or yield or grain protein ranking orders, implying there's little scope for farmers to reduce nitrogen without lowering the productivity of current varieties.

This would suggest feed variety selection shouldn't change when using lower nitrogen rates, the report concludes, while growers should also consider the impact of reduced nitrogen rates on meeting grain protein specs in milling wheat varieties.

Historical evidence suggests, the report

continues, that breeders targeting increased yields has indirectly led to improved nitrogen use efficiency at higher nitrogen rates, with the result that commercially higher optimum rates are being used.

“But there's no robust evidence to suggest these modern varieties can perform at lower fertiliser rates without compensatory losses in yield or milling quality,” implies the report.

Conversely in Denmark, where there are regulatory restrictions on the amount of nitrogen that can be applied, there are reports of varieties that can maintain high yields at relatively low rates due to being bred accordingly.

It's this finding that led the report authors from NIAB and ADAS to recommend that some RL trials should include winter wheat varieties tested under two nitrogen levels – the current RL protocol and a reduced nitrogen rate.



Levy payers were increasingly questioning the fungicide programmes in the RL trials, which are designed to exclude disease as much as possible, says Paul Gosling.



The 2022/23 review of the RLs attracted more than 900 responses from levy payers.

“In the short term, this would aid levy payers in selecting current varieties suited to lower nitrogen inputs,” the report suggests. “But in the longer term, this would stimulate breeders to start selecting in a low nitrogen environment, or to submit varieties that have demonstrated NUE and high yield, low optimum (HYLO) traits into the RL system, where they might not have previously been tested.”

While no decision at the time of writing had been made as to whether to include a small number of lower nitrogen trials in the RL, Paul says AHDB is keen to do so. However, a complicating factor is a likely requirement for similar trials to occur within the National List testing procedures, as well as breeders agreeing to look for improved NUE at lower nitrogen levels.

“If the NL doesn’t do those sorts of trials it’ll make it difficult for varieties to get as far as the RL,” says Paul. “And we also require breeders to respond because if they don’t bring such varieties forward, we’re wasting our time. We have to know whether they’ll breed for better nitrogen use efficiency or do they have other targets that are higher priority?”

If the trials do go ahead, a decision will have to be made on how much to cut nitrogen. Again, that’s not straightforward, says Paul. “At the moment, we don’t have

80 years of RL history

- **1944:** First RL was released on 8 August 1944 by NIAB
 - Included 16 winter wheat varieties – four milling, seven biscuit and five other varieties from over 100 available
 - Focused on England and Wales, narrative descriptions and quality traits
 - Average yield 2.5t/ha
 - **1952:** RL introduced the first 1-9 trait scoring system
 - Moved RL from being primarily descriptive to primarily numerical
 - Made it easier for farmers to grow varieties likely to succeed in their system
 - **1953:** Capelle Desprez wheat listed
 - **1964:** Maris Widgeon wheat listed
 - **1965:** Establishment of HGCA
 - **1973:** UK adopts European Community National List system to establish a candidate variety’s value for cultivation and use
 - **1976:** Maris Hobbit – the first UK semi-dwarf variety listed
 - **1986:** HGCA levy funds first used to support RL
 - **1991:** New variety evaluation scheme launched
- Funded by farmer levy through HGCA
 - Trials extended to cover whole of UK
 - **2001:** Responsibility for managing and producing RL moved to HGCA from NIAB
 - **2003:** Robigus wheat listed
 - **2004:** HGCA released RL plus interactive variety tool
 - **2008:** Management moved to AHDB in 2008
 - **2018:** Grower survey suggests disease resistance rather than fungicide-treated yield was the most important priority
 - **2020:** RL app launched
 - **2021:** Changes made to yellow and brown rust ratings procedure to give weighting to most recent year’s data
 - **2023:** Provides annual updated variety data for 11 crops in recommended and descriptive lists from 24,735 trials plots
 - Average wheat yield 8.6 t/ha
 - Current AHDB costs: £9,457,000 (2021-2026 project)
 - Total project cost: £23,404,000 (2021-2026 project)

80 YEARS
RL
1944-2024

a good handle for those farmers who are cutting nitrogen, how much are they cutting? Is it 20%, is it 50%? And are they cutting soil applied nitrogen and replacing it with foliar, which is a different question.”

Understanding what will be of greatest value to growers is important, although there’s an acceptance that to really make a difference, the reduction will have to be significant to create the environment

to breed for varieties which perform better in low nitrogen situations.

Decision made

In oilseed rape, a decision has already been made to not conduct reduced nitrogen trials for the RL, despite there being more evidence of OSR variety performance changing in response to nitrogen fertiliser rates.

But after speaking to breeders and other stakeholders for the review, there was an acceptance that the already large challenges in conducting successful OSR variety trials, such as cabbage stem flea beetle pressure, other pests and weather, meant it was unlikely levy payers would get sufficient information from these trials to be able to draw conclusions, says Paul.

“At the moment, we’re not looking to include differential nitrogen rates in OSR RL trials,” he confirms.

A similar scoping review into the impact of fungicides on varietal performance suggested current RL protocols could be adapted to test the performance of varieties under reduced fungicide inputs.

The report’s authors suggested three possible options for testing varieties under a

Data analysis for establishment method interaction

Does varietal performance change depending on how the crop has been established? That’s a question AHDB is seeking to answer by sending its RL data to statistical data consultants at the James Hutton Institute, says Paul Gosling.

“We have data on what the primary cultivations are at RL sites, but from a quick analysis there’s a lot of confounding data.

“For example, if you look at spring barley – all spring barley in trials in Scotland are ploughed while further south you have a mix of cultivation practices, so you have

the effect of both region and cultivations.

“But instead of doing lots more trials because of the added cost, we’re going to send the data to Hutton to see if we can pull any interactions between variety and cultivation from the data we already have.”

In oilseed rape that’ll include comparisons between direct drilled and other establishment systems, while for cereals it’ll be between trials that have some level of primary cultivation, he adds. “Not many trials operators have a cereal drill that can direct drill,” he adds.



Peter Gregory says tweaks already made to the RL include a revised layout to display all information about a variety on a double-page spread.

- ▶ reduced fungicide programme, as follows:
 - Test all varieties using a reduced programme aimed at giving broad spectrum disease control to provide additional info to the untreated and treated yield data
 - Test a subset of resistant and susceptible varieties, and predicting the performance of the rest using a model
 - Demonstrate the potential for reduced inputs on a subset of resistant varieties.

But the report also highlighted a combination of untreated and treated yields already produced by the RL, plus knowledge of the variety's resistance ratings, was all the information required to predict how the variety will perform under lower fungicide inputs, notes Paul.

That opens questions about the value for money of including extra trials in the RL, he says. "If we introduced winter wheat mid-level fungicide trials to locations that have both treated and untreated RL trials, it would cost around £83,000 more per year, at current prices. Factoring in other costs, it could easily add £500,000 to the five-year RL project budget.

"Given any reduced fungicide programme



During last year's review of the RL, farmers demanded greater scrutiny of pest and disease tolerance of varieties.

tested would just provide a mid-point reference and not necessarily match the programmes used by most farmers, we have to consider if it'd be a good use of resource."

Using models to predict responses to reduced fungicide inputs is another possibility. For example, ADAS has developed a model which can be used to predict average proportional yield loss due to disease, accounting for the effects of fungicide application, varietal disease resistance and varietal tolerance.

Currently developed for septoria, it has potential to be adapted for other diseases using data from RL trials, according to the review authors, to provide a user-friendly tool to help growers understand how varieties are likely to perform under reduced fungicide inputs.

While that approach has potential, Paul says it requires development and he questions whether growers would trust the result if it came from a model.

That leaves option three of using demonstration trials, possibly on AHDB Monitor or Strategic Farms, as perhaps the favourite way of delivering this type of information, although Paul stresses no decisions have yet been made.

"The reports have just been received and we have to look at them, consider what's most important, and see how we can incorporate that into the RL trials."

Understanding how quickly to respond to the pace at which farming is currently changing is a challenge, he adds. "If we take the example of nitrogen fertiliser, before the Ukraine war most people weren't that interested in it. It was a situation which developed quite rapidly and there's the possibility that if prices dropped to where they were before the war, interest in nitrogen use efficiency might fall away again.

"I suspect that won't happen because of the pressure to farm more sustainably, but we do have to be cautious about jumping very quickly to the way farming is changing. Equally we have to be aware farming is changing and we have to change with it.

"For example, we've put in place changes which allow varieties with novel traits such as BYDV resistance, to get onto the RL even if they don't have the necessary yield."

In fact, following last year's review where farmers demanded greater scrutiny of pest and disease tolerance of varieties, that, as well as yield, will be fully considered before any variety is recommended, says Peter Gregory, the independent chair of the RL project board.

"Automatic entry based on yield alone is no longer possible," he confirms. "In practice, that's been the case for most

varieties for at least five years, but the final exception has now been closed."

Other tweaks already implemented following that review include a revised layout to place all the information about a variety on a double-page spread to make comparisons easier, with yields and disease characteristics next to each other, he says.

"We're also committed to better online and mobile delivery of information, with a new app permitting comparison of three varieties of wheat on a phone screen being released."

It's part of an overall raison d'être to provide independent information free of any marketing considerations about the characteristics and market options of currently grown and new varieties of cereals and oilseeds, he says.

"This information enables farmers to select varieties that are optimal for their cropping systems and to supply the requirements of their various markets.

"Through its three technical crop committees, the RL facilitates the collaboration of breeders, farmers and processors to guide the development of varieties and ultimately to supply grains with appropriate characteristics into the supply chain, thereby providing a profitable return for all," he concludes. ■

Research roundup

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

For further info:

AHDB Project P2110377: AHDB Recommended Lists for cereals and oilseeds (2021-26) is led by a consortium, including AHDB, British Society of Plant Breeders (BSPB), Maltsters' Association of Great Britain (MAGB) and UK Flour Millers (UKFM). AHDB sector cost: £9,457,000; total project value: £23,404,000.

For more detail about the project, visit <https://ahdb.org.uk/rl-project>





“A mostly buckwheat companion crop provides excellent green cover and masks the emerging OSR.”

OSR new season

A recipe for success

In a bid to retain valuable oilseed rape within rotations, growers and agronomists are devising multi-faceted ‘recipes’ to help improve the establishment success rate of the crop. CPM finds out more.

By Janine Adamson

Much like the alchemy involved in baking a successful sponge cake, growing a profitable oilseed rape crop in the UK is dependent on the interactions between a series of critical variables and inputs.

And where adjusting a specific management technique may help to mitigate one risk factor, it could also inadvertently foster another, explains Jim Farquarson of Eastbury Estates in Blandford Forum.

With that in mind, he’s been working with agronomist Todd Jex from Agrii to devise a multi-point ‘establishment recipe’ to help ensure the 480ha farm reaps the wider benefits of having OSR within the rotation.

“You might ask why bother, but we’re limited on break crops and OSR is a profitable option if grown well. Our other break is spring beans which we grow no more than one in four, but they’re not for everyone and this season has proven especially challenging to get them drilled,” says Jim.

The farm can also struggle with blackgrass, meaning OSR is critical in

achieving adequate grassweed clean-ups using clethodim (as in Centurion Max) and propyzamide (as in Kerb) both ahead of and after first cereals.

So what does the farm’s establishment recipe entail? According to Jim, the first ingredient should be a fast developing hybrid variety. “A crop has to develop quickly in order to grow away from cabbage stem flea beetle and also our two-legged pests – the game birds from our commercial shoot.”

Top performer

DK Exsteel is Eastbury’s current OSR variety of choice, which Agrii agronomist and Dorset iFarm trials coordinator, Jazzmyn Jex, says is one of the best hybrid varieties in her region’s iFarm trials.

“Using drone technology which filters out the buckwheat and weeds, we can see the percentage cover of each variety in our trials. That, paired with data collection in person looking at crop biomass and growth stages, we’re able to clearly see the vigour of each variety throughout the autumn.

“DK Exsteel has been consistently good in our trials since 2017 in terms of autumn vigour from October through to January – always being top of the table in comparison with other varieties (hybrid and conventional).

“This early vigour is so important, especially if you’re drilling later to avoid CSFB as slug pressure is increased with a later drilling slot. The plant has to grow quickly enough to withstand the slug damage.”

As for drilling date at Eastbury, which is another ingredient in the recipe, this usually takes place around the end of August into early September, depending on weather and seedbed conditions, explains Jim. “We’ve found this is our sweet-spot

in avoiding the peak CSFB migration, although we’d be open to drilling later if the right variety came along to support it.”

Furthermore, Todd highlights the problems associated with drilling too early, which could prove tempting for some in a bid to overcome CSFB. “As a result, you may end up using clethodim very early in the season leaving some robust, well-tillered blackgrass plants in the crop to overwinter.

“Then, because we’re experiencing fewer frosts which would ordinarily knock the weeds back ahead of Kerb applications, it’s providing difficult to get a handle of blackgrass in the spring. Drilling OSR too early also impacts PGR requirements,” he stresses.

Once conditions are conducive to establish the OSR crop, it’s sown using an inter-row drill and GPS at 50 seeds/m², including a starter fertiliser. Todd says not only does this give the crop an early boost, but it can prove vital due to the farm’s chalky soils.



A crop has to develop quickly to grow away from cabbage stem flea beetle and also two-legged pests, says Jim Farquarson. Pictured with Todd Jex (right).



“IT FEELS LIKE
A REAL STEP
FORWARD”

Charles, Lincolnshire



LG ARMADA FULLY LOADED HYBRID

The highest yielding variety
on the RL with the added
security of LG's exclusive
seventh generation genetics



▶ “Even with good indices it doesn't mean those nutrients are available to the crop. This is because of the alkaline pH and high levels of calcium found in chalk soils; foliar nutrition is equally critical,” he explains.

But importantly, before drilling the OSR, a companion crop is sown into long cereal stubble (10-15cm) using a Moore Unidril in mid-August, as soon as the cereal straw from the previous crop is baled and removed. The aim is to provide a 10-14 day head-start prior to planting the OSR, says Jim.

“We've trialled a range of companion crops during the past 5-6 years including phacelia. Whereas it was very successful in controlling CSFB while attracting pollinators, a mild winter that year meant the phacelia performed too well and we took a hit on the OSR yield instead.”

Buckwheat preference

“Now we plant a mostly buckwheat-based companion which provides excellent green cover and masks the emerging OSR crop. We're also trialling fenugreek which emits a curry smell which neither CSFB or the game birds seem to enjoy,” he suggests.

Todd points out the wider benefits of using buckwheat as a companion crop. “It appears to be the best solution for Eastbury in terms of CSFB control, but there are additional positive outcomes of planting this species too.

“Buckwheat's root exudates are aggressive and very effective at mining locked-up soil nutrients. So when the companion crop dies off later in the season, this provides an extra nutritional hit for the OSR in the form of rich organic matter.

“It's just important that the buckwheat is planted ahead of the OSR, not at the same time, otherwise it won't sufficiently mask the emerging crop,” he adds.



According to Jazzmyn Jex, DK Exsteel is consistently one of the best performing hybrid varieties in the Dorset iFarm trials.

Both the companion crop and OSR are planted with a view to disturbing the soil as little as possible, because Todd says significant cultivations seem to attract CSFB. “We regularly see this trend – flea beetle appear ready to graze on land which has been disturbed, although we're not wholly sure why this is,” he queries.

Jim agrees that he's also seen this phenomenon in practice at Eastbury, which is one of Agrii's iFarms. “I'd love to know why cultivated fields attract CSFB. Of course in avoiding disturbance to suppress the pest, this can foster slugs if the seedbed is cloddy. It's finding a balance,” he says.

But this is a balance he's keen to achieve in order to retain OSR in the farm's rotation. “We have an animal feed business, B&W Feeds, which is an outlet for rapeseed meal (a co-product of rapeseed oil production).

“In fact, we're in the process of building a crushing plant which will make it very circular,” explains Jim. “So building more resilience into OSR through our approach to establishment is key in supporting our whole business.” ■

Risk mitigation methods

Of the 10 management techniques most valued by UK growers in reducing the risks associated with growing oilseed rape, no less than nine involve decisions ahead of, or at, establishment.

This is the key finding from in-depth analysis of the past three years of Bayer benchmarking, which involves around 500 growers and 50,000ha of winter OSR.

All nine of the establishment-related techniques were rated 7.5 or more out of 10 by growers for their value and, where employed, led to averages of more than 80% of crops planted taken to harvest.

Bayer technical manager, Ellie Borthwick-North, says the study shows a close relationship between autumn establishment scores and the proportion of crops taken to harvest each year. "This is so close in fact, that regardless of any other seasonal effects, scoring OSR in October will give you a very good idea of how much of the crop is likely to be worth taking to harvest next summer," she continues.

Standing out at the top of the list is sowing the crop only when conditions are reasonable, followed by eliminating compaction ahead of drilling, seedbed fertilisation and choosing vigorous fast-developing hybrid varieties.

Next is employing pod shatter resistant varieties, organic manuring and minimising costs until the crop is sufficiently established, as well as prioritising varieties with all-round agronomic strength and earlier drilling.

Conversely, according to Ellie, the only valued technique which isn't an establishment-related decision, is maintaining the best disease control.

"Most growers shouldn't find our results surprising. The fact that the 10 most valued techniques stand out from a total of 26 scored, though, clearly points the way towards the greatest success with the crop," she adds.

"However, underlining the important role genetics have to play, is the fact three of the top 10 relate to variety choice."

Ellie says it's gratifying to see the



Scoring OSR in October will give a good idea of how much of the crop is likely to be worth taking to harvest, says Ellie Borthwick-North.

vigorous, fast-developing hybrids that have been a key trademark of Dekalb breeding proving valuable. "Vigorous establishment has long been recognised as a varietal essential, but remains of limited value without sufficiently rapid development from two true leaves to get the crop away from autumn challenges.

"The increasing value seen from the pod shatter resistance we've pioneered alongside all-round agronomic strength rather than just specific traits, is equally encouraging," she points out.

Further analysis of the benchmarking indicates hybrid varieties generally perform better than conventionally-bred lines in their establishment, cabbage stem flea beetle larval levels, ability to deal with greater CSFB challenges, and in proportion of plantings taken to harvest each year.

"Our Ex hybrids, which carry the most valued attributes, have been found to perform noticeably better than other mainstream double low hybrids in each case – a testament perhaps to their greater overall robustness allied to compensation abilities.

"We see few, if any, differences in OSR success between establishment techniques during the years, although the vast majority of growers are employing some form of reduced tillage," comments Ellie.

"And while earlier drilling is highly rated, this doesn't necessarily mean sowing super early. Indeed, the real advantage appears to be from drilling before late August and any benefit from reduced CSFB larval populations only seems to come from September drilling," she concludes.



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“It looks as though the worldwide supply of wheat will be down, especially in exporting nations.”

Optimising economic wheat options

Better buying, better selling

So far, the 2023/24 season has been one many might want to forget, but a global tightening of wheat supplies could help drive up prices. CPM examines the current market, its future prospects and what growers should consider going into the coming season.

By Melanie Jenkins

Taking a look at the domestic and global crop markets, it's clear that volatility is likely to continue, but there might be opportunities for growers to take advantage of, and with the next season fast approaching, it's important to select varieties to help spread risk and push for premiums.

External markets, as well as economic and fundamental factors play a significant part in grain markets today, explains Openfield's head of sales and trading (wheat), David Brown. So what does the current situation look like, what's influencing it and where next?

"The evolution of the Nov 24 contract saw lows in February and March of this year, then through April and May the market saw a turn towards a more optimistic outlook only to see a reversal again in June losing £25 on the back of better maize plantings in the

US and greater stock carry outs in the US.

"In terms of the bigger picture, the 2023 Harvest saw a crop size of 14M tonnes versus 15.5M tonnes from Harvest 2022, imports are continuing to arrive into the UK, be it milling or feed, and I expect it to carry on into next year.

"We've seen new territory in the futures markets this year where we've seen a spread from May 24 to Nov 24, trading at between £25-£30. Lower crop production expected next year versus concerns about burdensome stocks has given the incentive in the UK to carry stocks to next year – the market was paying that price for the farmer and grain traders to do so," he explains.

"This illustrates how reactive the UK market is and the bigger picture is now driven by a lot of fund activity and algorithms, which affects markets going up and down. Funds covered the short position taken during the past 18-24 months going long EU futures in May."

Imported impacts

UK prices have been capped because of imported Ukrainian and Polish maize and feed grain. "Black Sea prices were relatively cheap, pushing our markets down. They've now risen during the past few months, but we've also seen a lot of cheaper Brazilian maize which fundamentally dictates the base price for feed wheat," adds David.

Russian prices have been competitive with the EU with a large crop initially expected, but IKAR (a Russian analyst) has declared a drop in the anticipated 90M tonne crop to 83.5M tonnes, he says. "We're seeing major global milling wheat stocks continuing to look tight and all eyes are on new crop now."

So what lies ahead? David sees the

war in Ukraine continuing, with wheat and maize production forecast down 6-6.5M tonnes. "The war in the Middle East continues which will keep affecting crude oil, ethanol and maize as all of these are interlinked, as too are logistics."

EU winter wheat planting forecasts are lower due to the heavy rains and flooding seen not just in the UK, but also in France, Germany and Baltic states. Whereas in Spain, Italy and the Balkan states there's been adverse dry weather conditions, he says.

Due to the managed funds covering their wheat and maize shorts (buying back borrowed stock to return it to a lender/close out an open short position) market action across the board in April and May saw values rise £50 from the Nov 24 contract lows seen on 6 March 2023, so there



Although the UK will likely see a smaller wheat crop this harvest, the price will be dictated by what it can be imported at, explains David Brown.



Duncan Durno believes some growers may be deterred by the extra management required to meet specification with Group 1 varieties, but feels the economics still stack up.

was certainly a spike, explains David.

“In terms of the 2023/24 ending stocks, which were perceived as burdensome and bearish for the market, it did pay a carry due to the forecast lower production this coming harvest, with the EU Commission estimating wheat ending stocks dropping from 20M tonnes (2023/24) to around 13M tonnes (2024/25).

“It looks as though the worldwide supply of wheat will be down, especially in exporting nations, which is partly why everyone is looking at new crop and the wheat markets have had a fundamental bullish move.”

All other eyes are on maize, particularly production levels and the weather in South America, because maize will dictate feed wheat prices around the world, says David.

Closer to home, UK wheat production is going to be down to yield, due to less hectareage having been planted, with estimates ranging from 9M tonnes up to 11M tonnes, he adds. “Ultimately, with a lower crop number, the UK will be required to import and therefore our prices will be capped at the import parity.

“Both the macroeconomic environment and inflation will continue to drive the narrative in the second half of the year,” he adds.

What does this mean for the hard feed market? “Because there’s a smaller planted area, the expectation is that we’ll be importing, but it’s very much dependent on yield for the UK and the quality profile of the crop which we’ll only know once we start harvesting.

“All-in-all, the UK markets have been more volatile during the past few years, but since the lows seen in March this year, there’s been a fundamental reason for



LG Beowulf has a strong disease profile, is consistent, stiff strawed, has a wide drilling window and is the highest yielding wheat on the RL at 106% of control.

wheat to increase and the funds exiting their positions of buying in and going long in the derivative has certainly helped push the markets along. I think the UK will be moving into a smaller wheat crop, but the price will be dictated by what we can import wheat at,” he concludes.

Varietal selection

For growers gearing up for their 2024/25 plantings, there’s a balance between marketing the current harvest and planning ahead for the future, with one of the key areas within their control being the selection of which varieties to grow to help meet their desired outcome, says Openfield’s arable technical manager, Duncan Durno. “Selecting the right variety on farm and for your end market goals can play a big part in performance during the coming season and there are a few new varieties that warrant a good look at.”

Considering Group 1 options, some growers may be deterred by the extra management required to meet specification, but according to Duncan, the economics still stack up. “Although we know the agronomic problems of some Group 1 varieties in terms of yellow rust, the economics of premiums

at present – and for Harvest 2025 at the moment – are still very viable regardless of the extra cost required for disease control.”

Digging into the different variety options, Duncan believes Crusoe still offers a more manageable option which is easier to achieve specified protein levels than other varieties.

SY Cheer (97% of control on AHDB’s Recommended List) is a new Group 1 variety that brings improved disease resistance much needed in this Group, highlights Duncan. “UK millers want to look at small scale samples from Harvest 2024 before hopefully giving full approval in September, giving milling wheat growers time to assess the situation before scaling up for 2025 plantings.”

Duncan sees the Group 2 market as somewhat split into two camps at present, with KWS Extase (101%) and KWS Palladium (100%) potentially attracting larger premiums than the others in the Group. “Both varieties have very sound agronomics, particularly around septoria (scoring 7.4 and 7.3, respectively). Although there are indications that Extase is becoming more susceptible to yellow rust (scoring 7 on the RL), it’s still at very manageable levels. ▶



When considering erratic seasonal weather conditions, Ron Granger points out that the varieties that tend to cope best are those with higher specific weight.

► "It's a less risky Group than the Group 1s, and it suits those who still want to grow quality wheats that'll attract a good premium, especially on lower to medium yield potential sites," he adds.

The area of Group 3s grown has fallen to an almost non-existent level, accounting for about 3% of plantings, says Duncan. "But one of the key varieties to come through this year is Elsoms' Bamford, a new addition to the Group that offers growers various opportunities.

"It's important to not pigeonhole Bamford into this Group because its yield is up there with the highest yielding feed wheats at 106%. Its disease resistance and agronomic package are as sound as virtually anything we have in the feed wheat sector, and if you have the capacity to store softs separate to hards then there's potential to attract a premium. But if you don't achieve this, then there's nothing lost."

According to Elsoms' George Goodwin, Bamford has come through as having some of the widest marketing options available. "It's approved for biscuit making, distilling and for export, but on top of that it's an out-and-out high yielding wheat and so can be grown as a feed.

"We believe it could bring a resurgence to the Group 3s and boost their profile, which is something the market requires to keep it competitive. I also think it could help change some mindsets, where people have perceived softs as being lower yielding than hards."

Looking at the soft Group 4 sector, Duncan believes Bamford almost overrides it. "But there's still some LG Skyscraper being grown, especially on lighter soils or in second wheat situations, but it comes with the cost of septoria management."

Duncan sees Dawsum (103%) and

Champion (106%) taking a significant percentage of the hard Group 4 market. "I think Dawsum's disease resistance has held up well and doesn't seem to have had issues with yellow or brown rust (9 and 7), and it's septoria almost looks better than it has in the past (6.3). Champion complements Dawsum and also has strong disease characteristics including orange wheat blossom midge resistance."

But for any large hard feed wheat growers, Duncan argues that they should be looking at LG Beowulf. "Not only does it have a strong disease profile, but it's very consistent, stiff strawed, has a wide drilling window and is the highest yielding wheat on the RL."

Yield potential

Beowulf sits 0.5% above its closest competitors on the RL at 106% of control, says Limagrain's Ron Granger. "The key thing about this variety is its yield potential across all regions, including the North, and it also has a high untreated yield to back that up at 91%."

A further vital attribute is consistency across different seasons, which is especially important given the erratic conditions that have been experienced in the UK during the past number of years, says Ron.

In terms of rotation, the variety achieves 106% as both a first and second wheat, and in the early drilled slot it yields 105%, while in the normal drilled position it 106% and then late drilled it sits at 108%.

"Gleam was very successful because it also had this wide drilling window opportunity so it's really useful that Beowulf is capable of this as well."

Both treated and untreated, Beowulf

scores 8 for lodging, with or without a PGR. "This is a great attribute to have in any variety and is at the top end of varieties on the RL," adds Ron.

Beowulf scores a 9 against yellow rust and a 6.7 for septoria and it has orange wheat blossom midge resistance. "All growers and agronomists want at least a 6 against septoria now, and a lot of growers in the South East won't grow a variety without OWBM resistance," adds Ron.

In terms of grain quality, Ron points out that the varieties that tend to cope best with erratic seasonal weather conditions are those with higher specific weight. "Beowulf has a specific weight of 78.3kg/hl, as well as a high Hagberg at 253, and good protein at 11.1%," he says.

"From our portfolio, it ticks more boxes than most varieties we've had and it has the traits growers are looking for on farm to provide security. I feel that Beowulf is Gleam but with better characteristics and the potential for higher yields on farm." ■



According to Elsoms' George Goodwin, Bamford has some of the widest marketing options available.

Better buying, better selling

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

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

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

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“ Specifically choose varieties to accommodate an early approach. ”

Early drilled wheat

Getting ahead

With the recent washout autumn proving a stark reminder of the volatilities of Mother Nature, some growers will be conscious to drill winter cereals as early as realistically viable, to avoid missing out altogether. *CPM* speaks to experts to understand the pros and cons.

By Janine Adamson

As the saying goes – once bitten, twice shy. And given autumn 2023 affected most growers in one way or another, namely through the inability to drill winter cereals due to relentless wet weather, some may be questioning a return to early drilling to avoid a repeat performance.

While experts advise simply holding out until optimum planting conditions arise, for some, a combination of the right variety and appropriate management techniques mean going early could yield positive results.

NIAB's variety specialist, Clare Leaman, believes it'd be easy to outright discourage growers from this approach, but given the difficulties of the past year, she fully acknowledges the pressure to get on as soon as the land permits.

“The advice would always be to avoid farming for the year that's just happened and to instead focus on the year ahead. Two back-to-back wet autumns would be very unlucky, but we seem to experience such weather extremes – it's a complete lottery.

“Either way, there has to be an awareness of problems that may be incurred as a result of changing drilling date, the main one being blackgrass control. Afterall, this is one of the primary reasons why growers shifted to planting winter wheat later,” she explains.

For those forging ahead, Clare believes the first step is to select an appropriate variety given some wheats are genetically suited to early drilling. “Certain farms with large hectarages will be familiar with this as they can't avoid having to plant some areas first, so it's simply a case of ordering the different varieties they have in the shed based on a per-field basis.”

Close attention

“Whereas for others who are perhaps returning to an earlier date or trying it for the first time, they'll have to specifically choose varieties to accommodate an early approach, paying particular attention to agronomic attributes and disease scores.

“Don't assume that any left-over seed in the shed from last season will fit the bill – be sure it's suitable for the given timing,” stresses Clare.

So what are the key things to consider when picking a variety for an earlier

drilling slot? First off, because the crop is in the ground for longer, this means there's a greater risk of lodging therefore stiff straw is a must, says Clare.

Then, the earlier a wheat crop is drilled, the more susceptible it is to septoria. “Research undertaken by AHDB explores how septoria disease resistance shifts in response to drilling date. The work suggests that compared with the Recommended List ratings, on average, early sowing (average 22 September) decreases the effective rating/score by approximately 0.6.

“Therefore, aiming for the highest septoria score you can to begin with will help to offset that a little,” she suggests.



Clare Leaman says there has to be an awareness of problems that may be incurred as a result of changing drilling date, the main one being blackgrass control.



Being slow off the blocks, Typhoon is ideally suited for those looking to drill early, suggests Ron Granger.



Matt Shand says Wynnstay has been a strong supporter of Typhoon since it first joined the Recommended List.



Richard Jackson says yield-wise, Typhoon is middle of the road, but it tillers well which may surprise some.

► The third consideration is speed of development, which Clare says is integral to avoid forward or fast developing crops. Instead, slower moving varieties are better.

“Without these three aspects, you can expect to face more septoria and a high risk of lodging. Also, for those in areas with grassweed issues, there’ll undoubtedly be higher blackgrass pressure as a result of drilling early.”

On the market since 2022, Group 4 hard wheat LG Typhoon offers the above criteria and more, believes Limagrain’s Ron Granger. And whereas it doesn’t deliver the same blockbuster yields as others on the RL, it instead has a secure package to support both early and conventional drilling slots.



One of LG Typhoon’s stand-out qualities is its septoria resistance, scoring 7.2.

“It yields consistently across all regions and performs well as a robust second wheat too. But where it really stands out is its septoria resistance (7.2) – one of the highest scores available – which has really been put to the test this season,” he continues.

All-rounder

“Equally, it has stiff straw scoring 7s for resistance to lodging both with and without a PGR, has OWBM resistance, and is high tillering. It’s a great all-rounder.”

Being slow off the blocks, Typhoon is ideally suited for those looking to drill early, suggests Ron. “It’s very prostrate in growth habit and develops steadily. This is important because you don’t want forward varieties going into late winter or the early spring as they’re more vulnerable to frost damage; even more so in the North where early drilling is common due to weather constraints,” he says.

“But just because it’s slow doesn’t mean a compromise on ear fertility or tillering – both are good and consistent to deliver quality at harvest.”

According to Ron, it’s the rounded package of agronomic traits which will have grower appeal. “This security offsets the fact Typhoon isn’t the highest yielding. But importantly, you don’t have to drill the variety early, it’s grows well planted at a conventional timing too.

“It’s just not suited for later drilling within a high blackgrass scenario. It develops too slowly to compete with the weed pressure and better varieties undoubtedly exist for those situations,” he adds.

In terms of what growers are familiar

with, Ron says Typhoon is a Claire replacement – the historic variety associated with early drilling – but appears to have improved agronomics. However, this doesn’t mean a relaxed approach to crop inputs.

“Agronomic strategies have to change if opting to drill early, particularly for fungicides and PGR programming and timings. Planning ahead is critical,” he stresses.

Clare concurs: “Design spring fungicide programmes accordingly to accommodate a hit on the septoria score, and be fully aware of the risks involved. Furthermore, there’s no guarantee of an earlier harvest, that’s not the purpose of early drilling,” she says.

Farmacy agronomist based in the Lincolnshire Wolds, Richard Jackson, agrees that Typhoon’s characteristics appeal. “I’ve been looking after Typhoon for a couple of years now and find it’s a reliable all-rounder.

“One of the main concerns with earlier drilling is that it exacerbates septoria pressure, and with the wet springs we’ve been experiencing recently in the East, you can see high pressure on those early drilled crops. Typhoon’s high septoria score is reassuring.”

Of the varieties currently available on the RL, Richard says he tends to only have confidence in one or two when it comes to planting early, and believes Typhoon is perfectly suited to the early window.

“Many new varieties are better for later drilling, but there are fewer options to support earlier planting while instilling confidence that they’ll be standing at the end. But again, Typhoon is very strong in this area,” he adds.

Growing Typhoon for seed

Steve and Mark Ulyott of Farfields at Middleton-on-the-Wolds in Yorkshire have been growing LG Typhoon as a seed crop for Wynnstay for two years. The brothers farm across both Farfields (base) and land shared with Jonathan and Peter Walker at Manor House Farm in Lund.

Drilling around 42ha in total this year across all of the farm's seed contracts, Steve says they prefer to stick with one variety rather than chop and change. "With low grassweed pressure on some of our land we can confidently drill from mid-September onwards. Our preferred variety was KWS Grafton which is no longer available and we struggled to find a replacement.

"Having tried different varieties which didn't work for us, we finally had success with Typhoon," he explains.

Among Steve's feedback is although Typhoon doesn't combine as early as Grafton, it's a solid performer. "It's also midge resistant (OWBM) which is a must, it's just not worth the risk of choosing a variety without it.

"With a solid disease package there doesn't appear to be any obvious flaws other than its lack of competitiveness with grassweeds, but given it's planted on clean land, this shouldn't prove an issue," he says.

Furthermore, Steve believes growing Typhoon this season helped to boost the brothers' chances of getting drilled up across the business' 270ha, which otherwise might not have been the case due to the inclement weather many experienced.

The rotation includes winter wheat, winter

barley and vining peas across both free-draining 'Wold' land and heavier clay soils. Steve says the latter can be quite unforgiving. "The stronger land we farm, which happens to be for our seed crops, doesn't offer many days to travel so we can experience few good drilling days which puts pressure on workloads across the whole area.

"Yes we acknowledge the yield compromise of Typhoon but appreciate the ability to drill early more, which alleviates that pressure – it's a trade-off we're willing to take – we'd rather have the confidence and flexibility."

Whereas last year Typhoon was grown solely as a first wheat crop, this season, half of its area is down to second wheat. "The second wheats were drilled early October and went in well during a rare weather window. So far it looks pretty good which demonstrates the flexibility of the variety.

"Because we're growing for seed, our primary aim is to have the crop standing strong at harvest. This can be a challenge due to having livestock including B&B pigs, meaning we have a lot of muck and slurry, including FYM produced by the Walker's Rossellie Herd of Limousines, which makes for fertile land.

"As a result, we have to monitor all of our crops carefully and pay attention to PGR requirements as the weeks progress," he explains. "Typhoon's short, stiff straw is a positive in this situation."

Equally, Steve believes the variety's disease ratings have provided a much welcomed buffer when it comes to fungicide applications



According to Steve Ulyott, Typhoon's disease ratings make it more forgiving than other varieties which helps when prioritising field work.

recently. "It's more forgiving than other varieties which helps when prioritising field-work; it has excellent scores for both septoria (7.2) and yellow rust (9)."

But with Typhoon being a slow mover compared with other varieties, does this ever concern Steve? "Its spring growth can be frustrating because it's not moving when other varieties are. But if you're aware of that, it shouldn't be unexpected," he points out.

"With so many influencing factors these days, it's understanding your varieties, their associated trade-offs and acting accordingly. We appreciate the ability to spread our workloads and avoid a struggle when combining. Typhoon offers all of this," concludes Steve.

Richard admits yield-wise, it's middle of the road. "It doesn't offer outstanding yield but it does tiller well despite being slow developing, which may surprise some."

Also supporting Typhoon is Wynnstay's Matt Shand, who says the company has been a strong supporter of the variety since it first joined the RL. "For the past two years I've always thought Typhoon looked outstanding in trials and has a very high untreated yield score to back this up.

"A lot of varieties are suffering this season with the high disease pressure, however, Typhoon appears to be withstanding this better than others. Equally, something to consider is how consistent its yield has been during the past few years across the seasons and regions," he explains.

Matt agrees with Limagrain's early

drilling position for Typhoon: "It has the right agronomic characteristics in this slot even at lower seed rates because of its tillering ability and slow plant development.

"You can see from yield data that it performs very favourably and certainly when promoting an early drilling variety this year to our customers, Typhoon will be one of our top picks."

So do the experts believe growers will want to jump the gun this coming season? "I won't be encouraging my growers to drill early purely off the back of the tough autumn we faced last year," says Richard.

"But you have to start somewhere and in that early slot I'm looking for varieties with good standing ability and a robust agronomic package; Typhoon certainly ticks those boxes," he concludes. ■

Sponsor's message

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



A glimpse of gold

Insider's View: Wheat

As the challenges of modern crop production push farmers towards cutting inputs while achieving the same results, could new bread-making variety, RGT Goldfinch, be a breakthrough as the first commercial insecticide-free wheat on the market? CPM digs into the details.

By Melanie Jenkins

The goldfinch of farm hedgerows is both brightly coloured and adept at pecking seeds from thistle heads, and is even mentioned in the unfinished 'The Cook's Tale' by Chaucer, but new quality bread-making wheat, RGT Goldfinch, has only just begun to tell its story.

As the first quality wheat with bread-making potential that's resistant to both barley yellow dwarf virus and orange wheat blossom midge, alongside having a strong agronomic package, could it offer growers after a premium the peace of mind they've been looking for?

RAGT's Lee Bennett certainly thinks so, highlighting it's a wheat that appeals to growers looking to embrace the Sustainable Farming Incentive, utilise integrated pest management and go insecticide free.

Goldfinch has been dubbed the 'insecticide-free wheat', but as Lee points out, this is technically something growers can do with any wheat variety. "The difference with Goldfinch is you can go insecticide free without any risk," he states. "There are

a lot of farmers who don't use insecticides and there are a lot more that don't want to use them, and alongside the SFI payments, the direction of travel is to move away from using them on farm.

"In a situation where there's background BYDV and the insecticide regime is either absent or poorly timed, we're seeing RAGT's Genserus (BYDV resistant) varieties, such as Goldfinch, come to the top and out-perform other varieties.

"Although Goldfinch might not be the highest yielding, it's a safety net which provides yield consistency when adversity would otherwise negatively affect the crop – I think it's a step forward for plant breeding and UK farmers."

RGT Goldfinch is currently in the AHDB Recommended List trial system as a candidate being considered for recommendation this autumn. While trial conditions are undertaken with strict management protocols in place, Lee highlights the variety has the ability to show its true performance when BYDV is present, even at sub-clinical levels, when more susceptible varieties can still leak yield.

"In an insecticide free scenario, its performance will shine through every single time but we just don't see these conditions in official trial situations. In our own trial plots last harvest, which were inoculated with BYDV-carrying aphids, and which received no insecticide treatment, Goldfinch yielded 106%, Skyfall 95% and Extase 92%, in line with the performance of BYDV-resistant varieties in similar trials carried out over the past few years."

RAGT's BYDV-resistant material pipeline utilises Bdv2 genetics which greatly reduce the levels of symptoms the plants express from the virus, explains RAGT's plant breeder, David Schafer. "Goldfinch has come out of a long-term breeding effort which involved incorporating Bdv2,

“ Trying to compare the likes of Goldfinch with Skyfall is like trying to compare chalk and cheese.”

Lee Bennett highlights that Goldfinch is a wheat which appeals to growers looking to embrace the Sustainable Farming Incentive, utilise integrated pest management and go insecticide free.

originating from a wild wheat progenitor into UK adapted germplasm that'll provide the traits required by UK growers."

It was at the point in the breeding programme that Goldfinch demonstrated bread-making characteristics when its potential as a commercial variety really came through, says David. "We had various material that was showing BYDV resistance, but with Goldfinch's combined bread-making quality and disease characteristics, it had a lot of potential."

So why is BYDV resistance so important? BYDV is an aphid transmitted disease which can result in severe yield losses of up to 60% in susceptible varieties of wheat, according to AHDB figures.

And it's a problem that's getting worse due to climate change, says entomologist, Alan Dewar. "Because of climate change, there's a higher risk of aphids being able to



Stuart Attridge has been impressed with Goldfinch so far, and says it's a variety that could garner attention for its green characteristics.

Scoring high against disease

Andrew Pitts first became aware of Goldfinch shortly after Harvest 2022 and saw it as a great opportunity to further the move towards regenerative farming at The Grange, Mears Ashby in Northampton. "I've had a relationship with RAGT for more than 20 years, growing pre-basic seed, so to be with them at the forefront of plant genetics is really interesting."



Andrew Pitts saw Goldfinch as a way to support his regenerative farming journey.

Goldfinch stood out to Andrew due to its Genserus BYDV-resistant genetics alongside its resistance to OWBM, and its capacity as a milling variety. "Its disease characteristics are brilliant – there's just nothing else out there like it."

Andrew's 4.5t of seed was direct drilled into ground which had been two years off wheat, in late September 2023 following a pea crop. "We applied our normal pre-emergence programme based on the level of blackgrass we expect, applied no insecticides and fed the crop 160kgN/ha for yield and another 40kgN/ha for protein."

Because Andrew has grown the crop for pre-basic seed, he applied a far more comprehensive fungicide programme than if he'd been growing it commercially. "If this were a commercial crop it would only have had a T2 at flag leaf and a T3 when the ears emerged. But because this crop was grown to maximise both quality and yield, it's been grown to a different protocol," he explains. "As a commercial crop it would have £30-£40/ha less spent on fungicide inputs."

"It currently looks terrific, having tillered well and has been clean as a whistle all through the season. Protein levels are predicted to be at 13.5% where the crop's been fed appropriately, so I'm expecting it to perform. I'm excited to get the combine into it and compare it with other varieties on farm. I think it's a real step forward and I'm sure there'll be premiums for it commercially, so I'll definitely be growing more next year."

Andrew isn't fazed that Goldfinch isn't the highest yielding milling variety in a treated situation, seeing the potential to save on insecticides, the possibility to reduce fungicide sprays and gain SFI payments as more than outweighing this.

"You couldn't get a better variety agronomically, and the industry has been desperate for a decent low risk milling wheat. The lower cost of production, alongside premiums, will outweigh the lower yield – it's all about gross margin per hectare rather than out-and-out yield."

overwinter as live insects rather than eggs, and their evolved asexual lifecycles are more of an issue than they were previously."

The main species that transmits BYDV is the bird cherry-oat aphid, which is a host alternating aphid, meaning it originally moved between woody primary and graminaceous secondary host plants between winter and summer. "If we were still seeing this happen at 100% across the species, then we wouldn't have the issues

with BYDV that we do now because the adults wouldn't be wintering on cereal crops.

"But it's now more of a problem because it's evolved an asexual lifecycle in temperate areas, so the warmer it is in winter, the more the asexual forms of the species are selected. It's the evolution of this asexual lifecycle that's made BYDV such a problem."

With the past winter having been very mild, Alan points out the proportion of asexual



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Insider's View: Wheat

► forms of the aphids in the UK are likely higher than they were the previous year. "The lethal temperature is -7°C , so if there are ground frosts or the air temperature is below this, then the aphids will be killed off. But in mild autumns they're still able to cause the virus to spread before frosts occur."

Alan points out that in barley, BYDV will present as yellow colouring, but in wheat it's reddish to maroon. "It's most prevalent in earlier sown crops rather than later ones, and is more likely to be seen in areas where the aphids have a higher survival rate such as in the South West. In certain areas, a lot of a crop can be lost by sowing early and not controlling the spread of the virus promptly," he says.

"There are also issues surrounding the continued use of chemicals to control aphids such as pyrethroids, whereby

insecticide resistance occurs or non-target organisms are impacted, which is why genetic resistance is so valuable and I believe is the way forward."

However, Alan worries that so long as pyrethroids are so cheap, this could inhibit the uptake of resistant varieties especially where there's a yield lag. "We have to change our mindsets, because if we continue to use chemistry as we have done resistance to insecticides could develop, undermining their benefits."

Alongside its BYDV and OWBM resistance, Goldfinch scores an 8 for mildew, 9 for yellow rust, 9 for brown rust and a 7 for septoria, says Lee. "It's the only variety throughout the whole registration process that showed both juvenile and adult resistance to all the prevalent strains of brown rust."

Goldfinch is of medium height, producing



As the first variety from RAGT's BYDV-resistant material pipeline, Goldfinch has BDV-2 genetics which reduce the levels of symptoms the plants express from the virus, explains David Schafer.

plenty of biomass, with good stiff straw and will respond well to PGRs, he adds.

A medium maturing variety, it's most suited to well-bodied land and can be drilled from early September through to the end of November, says Lee. In terms of seed rates, he believes Goldfinch benefits from an increase of 5-10%, or around 25-50 seeds/m² more than standard. "This'll allow the crop to produce more ears which will bring the yield with it. Like varieties such as Solstice and RGT Illustrious, Goldfinch tends to produce a measured amount of strong tillers and fewer secondary tillers."

According to Lee, this is why the variety achieves strong grain quality and good proteins. "There's no dilution from secondary tillering and the associated small green grains or their demand for nitrogen. Goldfinch has no issues achieving protein content and isn't hungry for nitrogen. It's regularly achieved a Hagberg in excess of 350 in trials and has provisional Group 2 standing and I'm confident that it's already well liked by millers," he adds.

Stuart Attridge of Harlow Agricultural Merchants has certainly been impressed with Goldfinch so far, noting it's a variety that could garner attention for its green characteristics. "A number of years ago we had a similar instance with KWS Extase where there were a few end consumers that were happy to pay a premium for its greener credentials because it required fewer inputs.

"Both supermarkets and flour users wanted it for its environmental characteristics and we're now seeing an increased demand filtering down for farmers to use fewer inputs."

Although Goldfinch ticks these boxes it also has to achieve the quality required by millers, and from what Stuart has seen so far, he's confident in its potential. "I heard about the variety about eight months ago and it's possibly as good as anything we have.

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"There's a shortfall of milling wheat compared with demand at the moment and we're seeing the premium reflect this, and based on the baking results of Goldfinch we've had, it looks to be very promising for this market," he explains.

Stuart says the issue with new varieties is there's always a lack of volume, so at present there's more demand for Goldfinch than can be supplied. "But after the coming harvest, we'll be able to supply more to millers and get a better picture of how it performs and if it yields on farm. However, based on the information we have so far, it looks very promising especially as the market will likely be moving to support more disease resistant varieties."

Chairman of Marriage's flour millers, George Marriage, also looks favourably on Goldfinch, indicating it could have a place in the grist. "Our focus is on producing consistently performing flour for our customers, so we're interested in quality future bread making wheats.

"Test samples milled from Goldfinch have been assessed in our test bakery

over three years and since 2021, it's performed positively – flour milled from this wheat has produced a good strong dough which was easy to handle, with the finished breads having good shape, oven spring and close texture."

There's a lot of material coming through RAGT's Genserus pipeline for growers to look out for, with feed wheat varieties currently at National List 1 stage and varieties suited to other Groups also coming through experimental breeding programmes in the UK.

According to David, there's a continual drive for improvement in breeding programmes and BYDV resistance is just one branch that's being explored. "We're also looking to combat the stability of production and so our objective is to tackle any and all traits that lead to instability." ■



George and James Marriage note that Goldfinch samples have been assessed in Marriage's test bakery over three years and it's performed positively, with flour milled producing a good strong dough.

Goldfinch at a glance

Yield (% treated controls)	
UK treated	-
UK untreated	-
East region treated	-
West region treated	-
North region treated	-
Grain quality	
Specific weight (kg/hl)	78.2
Protein content	11.6
Hagberg Falling Number	285
Agronomics	
Lodging without PGR	-
Lodging with PGR (%)	1
Straw length without PGR (cm)	87.8
Ripening (days +/- Skyfall)	+1
Disease resistance	
Mildew	8
Yellow rust	9
Yellow rust (young plant)	R
Brown rust	9
Septoria	7
Eyespot	5
Barley yellow dwarf virus	R
Orange wheat blossom midge	R

Source: RAGT

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“ We want to be a bigger player and it’s encouraging to see quality, robust options coming through. ”

RAGT open day

Broadening horizons

With the summer comes a host of open days from plant breeders, agronomy companies and product manufacturers alike. As part of this year’s tour, CPM heads to Ickleton to meet Lee Bennett and hear what’s in the pipeline for RAGT.

By Janine Adamson

The past few years have been on the slower side of business, discloses RAGT’s Lee Bennett. But that’s all about to change as the company prepares to launch a host of unique varieties, wider innovations and all-round alternative thinking.

For a start, it’s no longer just about wheat, although new material continues to feed through including eight new Group 4 hard varieties. But nevertheless, from optimised biogas feedstocks to winter oats, Lee stresses that RAGT is dramatically broadening its horizons.

At the fore is a commitment to all aspects of sustainability – whether that be environmental, financial or beyond – to support growers to make positive changes to their production systems. One solution

which he believes ticks many of these boxes is the company’s work to transform the establishment of cover crop mixtures.

“The idea is to combine three different seeds together through pelletisation to allow growers to broadcast a cover crop mixture into standing wheat, up to 15 days prior to it being harvested,” explains Lee.

“This gives up to an additional two weeks for the cover crop to get going, which could be the difference between successful establishment or not. It’s acknowledged that later-sown cover crops have less time to develop and therefore might not provide the desired soil health benefits; whereas this helps to mitigate that limiting factor,” he says.

Seed coating

The pelletisation works by coating seeds of different sizes and mass in a special inert technology which enables the mix to be broadcast up to 36m using a fertiliser spreader. Not only does this have benefits for the crop, but it also results in reduced sowing costs and fuel consumption.

“Pelleting the seed, which protects it while waiting for emergence, has been shown to improve the biomass of the cover crop – the soil coverage for the pelleted seed (oilseed radish, vetch and phacelia) was measured at 90%, whereas for the non-pelleted seed, 65%.

“Then using the MERCI method, which predicts the nitrogen available from cover crop residues over time, we can conclude that the pelleted pre-harvest mixture will return around 159kgN/ha to

the following crop, compared with 44kgN/ha for non-pelleted,” explains Lee.

As for using the fertiliser spreader to broadcast the seed, this reduces the fuel consumption to around 1 l/ha, he adds. “We believe this technique has a number of practical applications including for companion cropping oilseed rape, which we’re trialling across six UK farms this autumn.”

A topic which Lee freely admits he’s vocal about, is the use of insecticides, or in this case, highlighting the benefits of what’s being coined insecticide-free wheat. RAGT’s work in this area spans from its Genserus range of BYDV-resistant wheats, to rescoping how varieties are evaluated



A topic which Lee Bennett freely admits he’s vocal about, is the use of insecticides, including highlighting the benefits of what’s being coined insecticide-free wheat.

through the Recommended List system.

This is because on the whole, he believes most farmers don't want to use insecticides anymore. "It means trialling RL varieties using insecticides isn't a reflection of current on-farm practice. So we're running our own independent trials of 20 varieties across 18 sites, leaving them to natural BYDV infection.

"They're treated with a standard fungicide and PGR programme, but receive no insecticide. As a result, we have the only data set for varieties which offers a true reflection of on-farm practice. Of course for us, this means we can demonstrate the value of BYDV resistance when it comes to yield parity," says Lee.

Beyond this, the company has also been investigating sequential inoculation with aphids to evaluate the performance of different varieties and their response to BYDV infection across the season, including RAGT's pipeline genetics.

Spring infection risk

This is in reaction to the changing flight patterns and overall behaviour of aphids (the vector of the virus) – as winters become milder the risk of spring infection becomes greater. "Ultimately, we want to understand whether spring infection can really be that bad," queries Lee.

"We've seen the effects of spring aphid feeding and BYDV transmission at our sites in France – it exhibits as red tipping on the ears. So for the UK trial, we're inoculating with infected aphids in winter alone, both winter and spring, and then spring alone. This will enable us to understand the symptom nuances at a deeper level," he continues.

According to Lee, there's little awareness surrounding the potential of spring BYDV infection. "There seems to be less stunting at this stage in the season, but there's still discolouration and red tipping. It certainly has an impact which means potential yield loss."

Recognising this season's challenges in relation to inclement weather which resulted in greater spring cropping and then constricted seed supply, Lee says RAGT is working to bring a new range of alternative cereals to the market, including spring wheats.

However, what makes these spring wheats different, is they have no vernalisation requirements so can be sown from autumn through to April.

"Simply put, they behave like winter wheats but suit being planted in spring too, without the associated high seed



RAGT has been working to transform the establishment of cover crop mixtures through seed pelletisation.

rates which come with conventional spring wheats. These options are starting to pique interest because they offer more flexibility," comments Lee. "They're what we call a new style and are ideal for poor autumns."

Equally, he believes the market potential for spring oats is on the up too. "We see this as a growth segment having launched RGT Vaughan in 2023 – a clean variety which is suitable for the organic sector.

"We also have another three new spring oat varieties in the pipeline which all-in-all, makes for an active oat breeding programme," points out Lee. "We're also looking at winter oats, with an absolute focus on end use quality rather than just top yields."

For something different, RAGT has been investigating how to best cater for the growing biogas market to reduce the reliance on maize and rye, which Lee believes is the direction of travel. "I think there's a desire to create more diversity in feedstocks for anaerobic digestion.

"If you take a crop like winter triticale (RGT Eleac / RGT Rutenac), it actually delivers higher energy yields than hybrid rye which may prove surprising. Then there are options such as sorghum and sunflowers, or interplanting different combinations or all of the above," he says.

"Although maize is the largest grown AD feedstock in the UK at present, this may change as the threatened ban on seed treatments looms again, which would make it near-on impossible to grow the crop successfully."

And despite the message ringing loud and clear – RAGT is more than just wheat – the options for that crop look promising



The company has been investigating how to best cater for the growing biogas market to reduce the reliance on maize and rye, including the use of triticale.

too. That's because coming through the pipeline are eight Group 4 hard wheats at the National List stage, which Lee says is playing in new territory for the breeder.

"It's a given that in wheat you have to focus on yield, improved agronomic characteristics and all-round quality. This is in combination with our established BYDV-resistance mechanism found in the Genserus range.

"But we want to be a bigger player and it's encouraging to see quality, robust options coming through for the Group 4 hard wheats. But undoubtedly, the jewel in the crown this season is RGT Goldfinch, a new bread-making variety that's resistant to both BYDV and orange wheat blossom midge," he concludes.

Read more about Goldfinch on page 32. ■



“ It’s important to understand which cover crops are most appropriate to use when making a transition to no-till.” ”

Cover crop establishment

Research insights

Could a series of research projects looking at the impact of tillage approaches and climate change on cover crop establishment help Scottish farmers to make more of the valuable rotational tool? CPM speaks to the James Hutton Institute to learn more.

By Janine Adamson

Climate change projections suggest Scotland’s weather patterns are changing. As well as an increase in temperature across all seasons, it’s likely growers will face warmer, drier summers and milder, wetter winters.

At the same time, management challenges experienced in the North such as later harvests mean despite best intentions from growers, cover crops haven’t always been a roaring success.

But now, researchers hope to improve the accessibility of the tool by understanding how factors such as tillage techniques and extreme weather conditions impact the success rate of cover crop establishment in Scotland.

Dr Tracy Valentine, research leader for plant:soils interactions at the James Hutton Institute, is involved in two Scottish government-funded projects – ‘Healthy soils for a green recovery (Healthy soils)’ and ‘Crop improvement for sustainable production in a changing environment (Abiotic stress)’. Once collated, she believes

the project findings will help growers to make more informed decisions about which cover crop species to use and in which scenarios.

Healthy soils project

The Grieves House tillage trial was first established in 2017 and is currently funded as part of the wider healthy soils project. “This is primarily a tillage trial comparing full inversion with no-till techniques across two cropping approaches, but we began to investigate cover crops within the trial around three years ago,” explains Tracy.

“One half of the trial is a spring-based rotation featuring spring barley, oats and beans, whereas the other is a winter rotation where soils are covered at all times. It’s the winter rotation where we’re able to assess the cover crops,” she continues.

“Research has shown some species are better suited to non-inversion approaches, so our aim is to understand the varietal differences in crops and cover crops across the two tillage systems and what’s driving that.”

Currently, the project is measuring how different cover crops respond to the two methods by assessing plant biomass. “In year one, we observed that cover crop biomass (radish and rye) was significantly reduced in the no-till treatment compared with the full inversion plough.

“To investigate this further, in year two we planted oats and radish – although the radish biomass was again reduced in the no-till, the oats did much better. What this means is it’s important to understand which cover crops are most appropriate to use when making a transition to no-till,” suggests Tracy.

As well as measuring the biomass of the cover crops, the trial also involves quantifying the biomass of the subsequent weed burden. “We know there can be a trade off when implementing a no-till

approach, so understanding the relative competitiveness of the cover crops will be valuable insight to add to our findings.”

And although biomass is only an indicator of a plant’s establishment success, reduced effectiveness of certain cover crop species used in these systems is important information. This is because cover crops can be integrated in no-till systems as an approach to climate change mitigation through carbon sequestration and reduced fuel use, explains Tracy.

The next stage of the project will involve assessing a more diverse range of cover crop species, selected based on their rooting-ability.

Crop improvement for sustainable production in a changing environment

According to Tracy, this project explores the impact of abiotic stress and climate change on multiple Scottish crops including cover crops. The cover crop research began three years ago with lab-based experiments.

“We wanted to assess a cover crop seed’s



Researchers such as Tracy Valentine hope to improve the accessibility of cover crops in Scotland by understanding the impact of tillage techniques and extreme weather conditions.



Lab-based experiments have been taking place to assess a cover crop seed's response to water.

response to water – either drought or water-logging – at the initial germination phase. We did this by looking at seed coat mucilage which researchers believe influences

germination through its relationship with seed hydration. We also looked at effects of temperature on germination.

“To ensure a robust sample, we sourced seed for around 30 different species of cover crop from a range of suppliers, some of whom provided the seed in kind,” says Tracy.

The aim of the work is to understand which species – ranging from clovers and radishes to black oats and phacelia – establish best in different environmental conditions. Alongside the lab studies, field work is taking place to evaluate the success of these cover crops live in-situ.

“The trial is untreated, so it very much depends on the weather as it happens each season and comparing year-on-year. Plots were ploughed in the first year but will be direct drilled from the second year onwards.

“We have a weather station in close proximity meaning we can map the results accordingly,” explains Tracy. “And as we progress through the project, we’ll select certain cover crop species to take further through their life cycles beyond just the germination phase.”

Integrated research

The information gathered from these projects will be combined with plant temperature and light growth data in models that link to climate change projections for different regions in Scotland.

“While projections suggest central-eastern areas of Scotland will become warmer, they also propose it to be much drier in the August-September cover crop sowing window, potentially affecting germination rates.

“Further north, projections become much more uncertain, but the issue of quickly fading light for plant growth will still remain whatever the weather brings,” she adds.

Also, because previous James Hutton Institute research has investigated the rooting behaviour of different types of cover crops, this can also be layered onto findings. “The two projects certainly inter-link while being relevant to previous research we’ve undertaken at JHI.

“It’s about helping to improve the access to cover crops in Scotland and the North, so growers can reap the widely publicised benefits that they offer,” concludes Tracy. ■

Nuffield cover crop study

Nuffield scholar, Toby Simpson, first took an interest in sustainable farming when he returned to the family business and saw how Denton Lodge Farm’s soils had benefitted from a reduction in tillage.

“My father adopted a min-till approach and within 15 years we were able to see considerable improvements in soil health as well as labour/fuel savings. This led to a switch to direct drilling in 2019, but it was evident we required a bigger system change than that alone which is where the cover crops came in,” he explains.

The farm, which manages around 700ha, has a rotation featuring winter wheat, oats, spring barley, spring wheat, ‘boats’ (bi-cropped beans and oats) and stewardship schemes. Having dabbled with some catch and cover crops, Toby decided to explore the topic further with a Nuffield Scholarship.

And through his studies he was able to tour countries including Norway, Sweden, Denmark, Germany, France, Canada, North America and the UK, looking at comparable systems which could be translated back to the family farm in Cambridgeshire.

“One of my biggest learnings was that rather than soil being perceived as inert, it’s a living ecosystem which we have a responsibility to look after. Having living roots in the soil, as with cover cropping, is the cornerstone of all soil functions whether that’s biological, physical or chemical,” he suggests.

Furthermore, Toby says roots are system enablers and ubiquitous in what

farming should be aiming to achieve.

A key aspect of Toby’s travels which remains front of his mind was work presented by French researcher, Thierry Tétu. “Thierry shared the importance of plant densities above and below ground – up to 300 plants/m² – which creates a dense canopy and thick rooting framework.

“With the roots this results in a rhizosphere priming effect to release nutrients from the soil and exploit its potential, whereas the canopy captures CO₂ which is transpired from the ground, creating a greenhouse effect.”

Toby says the concept of planting more and truly investing in a cover crop resonated with him and is something which can be readily implemented. “I believe we can achieve this on the farm by home-saving some seed and then topping up with other bought in species.”

Another inspiring part of his study tour was meeting the late David Brandt in Ohio, who utilised cover cropping within a no-till system for around 50 years before passing away in 2023. “David worked his soils so significantly that they were re-classified. His approach was very simple with no silver bullet, but he’d looked after his soils for a really long time and that year-on-year transformation accumulated,” says Toby.

“It proves this doesn’t have to be complex to work, and for David, he could reduce his inorganic fertiliser use by around 75%



Having dabbled with some catch and cover crops, Toby Simpson decided to explore the topic further with a Nuffield Scholarship.

without an impact on crop output.”

Toby now hopes to implement some of his Nuffield learnings at Denton Lodge Farm, including planting more catch crops between rotations to reduce waterlogging and slug pressure. He’s also paying more attention to how cover crops are established.

“There’s no right or wrong way but it all comes down to seed-to-soil contact. For us, it makes most sense to drill our cover crops rather than broadcast, as this delivers more consistent results.

“But something worth considering is drilling depth – different species have different requirements and this affects how they’re planted. An example being crimson clover which prefers a shallow depth so could be dribbled on with a slug pelleter and then perhaps rolled,” he concludes.

Toby’s full report ‘Catch and cover cropping opportunities in UK arable agriculture’ can be found on the Nuffield Farming Scholarships website.



“ For some it’s more valuable to grow grapes per hectare under contract than sugar beet or wheat. ”

Grape minds think alike

Alternative crops

With international winemakers buying land in England to produce sparkling tipples, could viticulture prove the ideal diversification exercise for arable growers looking for something different? CPM reads between the wines.

By Tom Woolman

The greatest obstacle to running a vineyard is often the last thing to be considered, as Hutchinsons’ Rob Saunders summarises: “The most difficult thing is selling the wine.”

However, Little Wold Vineyard in East Yorkshire has tailored a solution to this problem, creating a wedding venue overlooking their vines. “It works extremely well,” says farmer and founder Henry Wilson. “The weddings are only allowed to use our own wine and we can sell up to 100 bottles in an evening.”

Henry first sparked the idea to start his vineyard after hitting a golf ball into one while on holiday in South Africa. “It was one of those surreal moments,” he says. “A beautiful day with beautiful scenery, with row on row of vines filling up with grapes.”

The home farm had some steep and chalky ground which tended to dry up

in the summer and never yielded well with cereal crops, he explains. So the initial idea soon developed to plant a small vineyard, which happened in 2010 with 2000 plants covering 0.7ha.

Top terroir

As luck would have it, the combination of soil, climate and topography, known as ‘terroir’ to those in the wine trade, produced an excellent product and Henry soon found himself unexpectedly winning prizes with his wine.

“We were told our vines were too young and too far north, but there we were winning bronze medals with everything we put in,” he says. “Now we’re disappointed if we don’t get a silver.”

UK viticulture has seen some spectacular growth during the past 10 years, with a 450% increase in hectareage, according to Dr Alistair Nesbitt of Vinescapes, a consultancy which specialises in viticulture and wine production.

And despite an estimated 4300ha of land under vine in the UK, there’s room for expansion, according to Rob. He highlights that winemakers from other countries are buying land in England to produce their sparkling wines and claim they can see the ‘writing is on the wall’ for their own production regions.

While the UK drinks an estimated 5M bottles of wine a day, 2023 UK production hit a record 20-22M bottles a year according to industry body Wine GB, leaving plenty of headroom for import substitution.

In fact, many farms may have an area where a vineyard could be planted and parts of southern England have similar soils to those in the Champagne region of France, meaning equivalent varieties can be grown, explains Agrii’s Matt Greep. But he pauses to celebrate the innovation of English wines, which aren’t constrained by the same rigid regulations that continental producers often are.

“You have great contract winemakers who are doing a wonderful job of making exquisite wines from a real mix of grapes and breaking the rules,” he explains. “The Champagne guys can only use three varieties in a very specific ratio.”

The first step for anyone aspiring to enter viticulture is deciding what sort of business model to follow. Growers can



Henry Wilson first sparked the idea to start Little Wold Vineyard after hitting a golf ball into vines while on holiday in South Africa.



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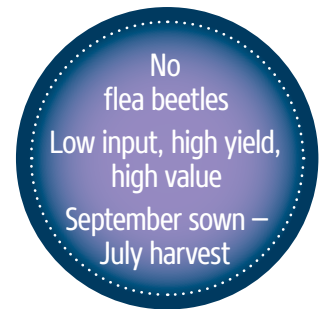
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UK viticulture has seen spectacular growth during the past 10 years, with a 450% increase in hectareage, says Dr Alistair Nesbitt.

► produce as an estate winery, with the growing, winemaking and marketing of a brand all under one roof. According to Alistair, operations like this can often command a premium for their tipples, with the provenance of the product superior to more commercial winemakers.

Otherwise, options include growing on contract for a winemaker, selling on the spot market, or a combination of the two.

"So much of it depends on why someone is going into this and what they want to get out of it," he continues. "If you're really passionate about wine and have the drive to grow grapes and produce your own product, then thinking about your target market, production scale, economics, skill set etcetera is absolutely critical before you even start the land hunt.

"For some people, they're growing the crop because it's more valuable to grow grapes per hectare under contract than sugar beet or wheat," comments Alistair.

Although vineyards are a long-term investment and will yield for 30-50 years, commercial contracts are typically 3-5 years and therefore every grower requires a plan B, he says.

While many different soils are suited to growing vines, the most important characteristic is they must be free draining. As well as sustaining the plant with the water and nutrients that it requires for production, research suggests different soil types have a pronounced effect on taste parameters and the wine's eventual 'style'.

It's imperative, therefore, that soils are fully understood and improved before any attempt is made at planting rootstock, stress experts.

Furthermore, a pH of 6.0-6.5 is ideal,

although for high alkaline or chalky soils different rootstocks must be sourced to avoid the risk of chlorosis. Lower pH soils should be limed in accordance with requirements, as with other crops.

The topography of a potential site is something that requires careful consideration, as it has a major impact on the productivity of the crop. And depending on location, the elevation should be no more than 130m above sea level with under 100m being highly desirable, says Rob.

"With every metre above sea level you get 3.4 fewer hours at 7°C over the course of a year. Given the parameters of good drainage, avoidance of excess wind and undue altitude, there can be a whole load of sites which work well."

Rob adds that sites should ideally be south facing and away from frost pockets as vines can be susceptible to damage in the cold. "A gradient on the site can help in this respect, with between 2-12% advantageous in allowing cold air to drain down slopes in times of frosty weather. An incline also has the benefit of creating a higher degree of solar incidence on the ground, meaning more sunlight reaches the crop."

Once a suitable site has been selected, varieties should be chosen to suit the environment and wine style that's desired, says Alistair. "However, the capital required to plant is substantial, with vineyard set-up costs being around £35-40k per hectare. Given the investment, it's critical that the preparation and planting is undertaken correctly," he says.

"We've seen some appalling cases of poor quality vineyard establishment in the

UK. The vines, in some cases, won't take or perform optimally. This can be due to poor quality sites, field or soil preparation, sub-quality planting or a grower could be given diseased vines to plant which as a novice it may be hard to be aware of."

Establishment methods

Young vines are highly intolerant of weed competition and plastic tubes are commonly fitted to young rootstock so herbicide can be easily applied around the plant. This also gives further protection from rabbits or deer.

Trellis should be erected for the rows of vines and setting the distance between rows is a careful management consideration – a higher density brings greater yields per hectare but also increases disease pressure.

Little Wold initially planted white grapes, but now the vineyard includes red varieties too, with red or rosé making up 25% of output. Today the business produces 10 different types of still and sparkling wines.

"Most of our wines are blends," explains Henry, adding that having a number of varieties spreads the options depending on the season. However, the likelihood of record breaking yields are far from certain.

This is because in terms of output, the two years following planting can expect to yield around 20-30% of the crop's full potential. But by the fourth year, yield should rise closer to 80%, with full yield obtainable from the fifth year onwards.

These outputs can be notoriously variable, highlights Rob. He notes that out of a five year period, the rule of thumb has been average yields



Growers should top vines once they grow above the trellis to prevent shade and leaf strip the fruit zone to get more sun to the grapes.



Research suggests different soil types have a pronounced effect on taste parameters and the wine's eventual 'style'.

for three years, bumper yields for one, and nothing for the final year.

Alistair, who completed a PhD in climate change and viticulture, adds that the changing climate is something which doesn't necessarily spell good news for harvest reliability.

"The warming temperatures we've seen during the past 20-30 years have contributed towards the success and growth of the industry, yet at the same time the climatic variability we see adds to the challenges which growers face in the UK and beyond," he says.

Alistair points to the sensitivity of vines to rainfall, with excess moisture increasing disease pressure, making access difficult and reducing successful flowering.

Ripening requirements

"When you have a greater amount of rainfall you also have a greater amount of cloud cover. When you have more cloud cover you have less direct sunlight and your ripening ability is reduced in the vineyard."

He cites 450mm as the upper end of rainfall he'd want to see during the UK growing season of April to October.

Vines also don't require a huge amount of nitrogen, and depending on the previous land use, they may even grow for several years without further applications, says Rob. "Phosphate and potash can be managed much like any other crop, with soil sampling recommended every three years and appropriate adjustments made."

When it comes to disease, the UK's damp climate means downy mildew is a constant threat, particularly as many grape varieties have been selected predominantly for taste and bred for the drier conditions

of continental Europe. This could mean growers find themselves spraying regularly during the growing season.

However, as vineyards are long-term projects, growers will have to deploy cultural control methods too, as they'll be unable to change variety or pathogen pressure for decades.

"You're left manipulating the environment to make it less favourable for disease," explains Rob. "You have to manage the herbage in the vineyard so it doesn't restrict airflow in the alleyways. There's also manual work to be done in manipulating the canopy, tucking it in and thinning it out so you can maintain air movement, reduce humidity and facilitate spray penetration."

Will Robinson from Hutchinsons agrees. "You have to manage the canopy to open it up and get sunlight and air

in to reduce the mildew," he says.

According to Will, growers should top the vines once they grow above the trellis to prevent shade and leaf strip the fruit zone to get more sun to the grapes. "All we're trying to do is harvest sunlight," he suggests.

Looking to the future, interest in regenerative production methods are increasing globally adds Alistair, but it's not simply managing a vineyard without chemical inputs, due to the cool and humid UK climate. "There's more support within viticulture now for people who wish to farm more sustainably, particularly as the synthetic chemical toolbox is rapidly emptying," he says.

"With vines only taking up 10% of a vineyard, there's lots of scope for using grazing livestock or cover crops as part of a system."

Kitty

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▶ With all of this in mind, it likely won't come as a surprise that vineyard work is labour intensive and securing a skilled workforce is one of the greatest challenges for an enterprise. "A good and loyal team is gold dust," says Will, who suggests growers should make every effort to retain quality workers.

And although labour gangs are available in some parts of the country, as with other parts of agriculture, these people are often in high demand.

"Regardless of opportunities for mechanisation it's a highly reliant production system. Pruning can't be done well by any robot, it requires skilled people to do it," adds Alistair.

Having secured a labour force locally, Little Wold is looking forward with their business. After using a contract winemaker for the early years, they took the decision to start making their own wine in 2020 which Henry describes as one of their biggest challenges to date.

"We have to get it right now," he emphasises. "You can have perfect grapes but if the slightest thing goes wrong in the winery that can really mess things up."

Yet demand for Little Wold's products currently outstrips supply and they continue to invest - production



According to Rob Saunders, the topography of a potential vineyard is something that requires careful consideration, as it has a major impact on the productivity of the crop.

is planned to triple once new vines reach maturity and the winery expands.

Even so, growing larger isn't easy, stresses Henry. He warns not to underestimate the amount of time it takes to educate lenders – with a long period between investment and sales, banks have to understand cashflow in detail before backing a project.

"We have half-made wine in tanks that's no use to anybody, but in a year's time it'll be a worth lot of money. You can't shortcut the process," he concludes. ■



Vines don't require huge amounts of nitrogen, and depending on the previous land use, may grow for several years without further applications.



“ While very few contracts are large scale currently, we see that changing during the next few years. ”

Incentivising sustainable action

Crop production insights

Contracts providing incentives for sustainable production are becoming increasingly common. CPM finds out more from Frontier Agriculture.

By Mike Abram

Although somewhat limited in scope, area or tonnage, contracts which include incentives for growers to produce commodities with lower carbon footprints are gradually becoming more commonplace throughout industry.

Among the drivers behind this rise are climate change and regulation – around 11% of UK greenhouse gas emissions (GHG) come from the agricultural sector. As climate becomes more unpredictable with resulting episodes of flooding, drought, soil erosion and extreme temperatures, food brands have become progressively more aware of the risks to their supply chains.

Pressure on businesses is also increasing from a growing list of regulations – companies are required to report not only on their energy consumption and GHG emissions, but also on nature and climate-related impacts and risks, and specifically what actions they are taking to manage this risk.

All of this is pushing food brands to seek new ways to support farmers

with sustainable farming practices, including financial incentives. Typically, these are either for sharing data to help companies within the supply chain better understand the carbon footprint and associated emissions involved in producing crops, or for practice change, or a combination of both.

Complexities

Obtaining real-world carbon accounting data is crucial to help drive the on-farm practice changes which will reduce GHG emissions, but it's also complicated, says Frontier's sustainability manager Sarah Burgess. "For a start, the data isn't as precise as with financial accounting systems we've become accustomed to for the past 150 years.

"There are a lot of assumptions, estimations, modelling and methodology updates involved in carbon accounting – even more so when it comes to carbon sequestration numbers used. It's further complicated by the varied scope and boundaries taken to deal with different targets.

"For example, when you're looking at NFU or UK net zero targets, you're looking at whole farm carbon footprints and emissions, whereas the supply chain is generally looking at the product being sold into it."

Obtaining the correct data becomes more confusing in that instance, with the potential for various activities on farm to interact with each other and careful consideration is required for what to include, she says.

But while there's a reticence from some to give up crop and field specific information, it shouldn't stop conversations in the supply chain on what's possible, she stresses, not least because of the huge reputational risks for businesses following the green claims code which came out in 2021.

That code forces businesses making environmental claims to have clear traceability data and lay out any assumptions or extrapolations. Reduction targets can't be managed, let alone achieved, without greater efforts to collect as much accurate



According to Sarah Burgess, obtaining real-world carbon accounting data is crucial to help drive the on-farm practice changes which will reduce GHG emissions.



Tom Lingham (L) and Nick Peters (R) have been working together to utilise tools such as deep nitrogen testing pre-season, NDVI analysis using satellite imagery and Yara's N-tester.

► information as possible, says Sarah.

While supply chains recognise the potential benefits of incentivising farmers to provide data which will ultimately help drive practice change and reduce carbon footprints of their products,

the sticking point is the requirement to quantify a return on investment.

To date, contracts based on this model have been limited to pilots so far, with more credibility of carbon accounting, calculator methodologies and modelling required to support greater investment.

One farmer involved in such pilots is Tom Lingham of Faulkners Hill Farm based in Sevenoaks, Kent. The mixed farm grows around 800ha of arable crops on heavy Weald clay, alongside around 100 suckler cows with followers, which are sold as stores.

Increasing media coverage of net zero targets piqued Tom's interest in reducing the farm's carbon footprint, and when approached by Frontier about a new collaborative project in 2019, he started to take more notice of his carbon usage and impact.

"It involved sustainably producing milling wheat and gave us some practices to adopt, with the trade-off of being capturing some data from the farm," says Tom.

The project was based around a sustainable wheat contract protocol requiring farmers to adopt techniques that improve soil health, reduce crop emissions as well as deploy land use practices that support wildlife. In

return, growers are paid £10/t premium over the price of milling wheat.

In practice for Tom, this has involved using reduced tillage, IPM techniques for targeting pesticide use appropriately and lower nitrogen rates, while still achieving the milling specification required. He also has to dedicate 5% of the farmed area to wildlife habitats such as winter bird food covers and pollen and nectar mixes, and manage hedgerows for biodiversity gains.

Reductions of nitrogen of around 10-15% on average on his Skyfall milling wheat have been achieved, reducing the total from 250-270kgN/ha to 220-240kgN/ha. While the required milling specification is still 13%, due to the nature of the particular project, a fallback to 11.5% has helped further support the adoption of sustainable practices.

A range of nitrogen products are used to maximise efficiency – usually that means a protected urea for the first application in February or early March, followed by liquid UAN for the first main dressing with Nitram (ammonium nitrate) for the second.

"Liquid is more targeted, while ammonium nitrate doesn't volatilise ammonia later in the season. It's using the right products, at the right stage to get the most efficient use," says Tom.

Trials show promise

Farmer Tom Lingham is involved in a project that will reduce the carbon footprint of growing wheat through using CCM Technologies' new pelleted, carbon negative organo-mineral fertiliser products made from either cocoa shells or digestate.

Frontier is a direct investor in CCM Technologies and has a distribution agreement in England, Scotland and Wales for the products.

Tom is one of 15 on-farm comparison trials testing the practicalities of these solutions, which have a negative carbon footprint, according to analysis by The Carbon Trust, as well as providing organic matter content for soil conditioning benefits.

The product was used in half field comparisons with his standard nitrogen programme fields of Skyfall, with it replacing standard nitrogen applications at the first and third applications. Each application supplied around 60-65kgN/ha together with small amounts of phosphate, potassium and sulphur, says agronomist Nick Peters.

Total applied nitrogen in these trials was the same in both CCM and standard programmes,

although their potentially slower release nature may provide opportunities to reduce how much is applied, he adds. "Which could help with some of the practical constraints that might limit the viability of rolling out the product more widely."

According to Tom, it's a really bulky product. "And because you apply it at 500-650kg/ha, forward speeds were around 2-3km/h compared with the usual 14km/h to get an accurate flow rate from the spreader."

Using a lime spreader type machine or a deliver and spread service might also be solutions to the practicality concerns, but in this first year of wider-scale trials, Frontier is seeking to understand whether the product works on farm as hoped before refining agronomic practice.

"I was a bit sceptical," admits Tom. "But I've been pleasantly surprised and while we haven't harvested the crop yet, there's no visual difference in it between the CCM product and our standard nitrogen programme."

The wet conditions this season may have helped with the pellet breakdown, but further



Tom Lingham is involved in a project that aims to reduce the carbon footprint of growing wheat using CCM Technologies' pelleted, carbon negative organo-mineral fertiliser products.

work during the coming seasons is required to fully understand how the products perform both agronomically and practically, notes Nick.



Rob Nightingale believes Frontier's role is about making sure data is used fairly and correctly.

Tools such as deep nitrogen testing pre-season, NDVI analysis using satellite imagery and Yara's N-tester are also proving helpful to targeting nitrogen applications, says Frontier agronomist, Nick Peters.

"We're using the N-tester on the flag leaf quite specifically now – we input a yield expectation, variety, and growth stage and it gives back some analysis and a recommendation," he adds.

Typically, the farm applies between 20-50kgN/ha at that timing, but having the live data from the N-tester is helping to tailor that application, says Nick, which can quite easily be a 10-20% saving.

Across other farms, Nick is also trialling the Hill Court Farm Research service which tests root extracts to predict grain protein levels, with a view to using that next season at Tom's. "It's been quite bold in the prediction that I've received back so it'll be interesting to see the results," he comments.

Nick has also been challenged to be more targeted with fungicide use, although he says growing Skyfall does limit options. "All milling wheat varieties have their challenges and yellow rust is the key one for Skyfall. On Tom's farm we missed the T0 this year, partly because yellow rust pressure at the time wasn't there, but also because conditions to apply anything were testing.

"So being fluid with the season, climate and what you're seeing is important – we don't have a blueprint we follow."

Tom also grows lower carbon oilseed

rape on a sustainability contract. Unlike the wheat contract, this pays for more sustainable practices rather than providing a premium on the harvested product.

"There are three tiers – bronze, silver and gold," explains Rob Nightingale, Frontier's national technical sustainability specialist. "Tom qualifies for silver which means he direct drills, uses SOYL services on his OSR, grows it with a companion crop and uses variable rate nitrogen."

Employing those practices earns him £70/ha. "We pay per hectare because it's easier to administer and gives clarity to all parties," says Rob. "And it makes it fair across geographies and farms where average yields may differ significantly."

Similar contracts are being rolled out for wheat and barley via other supply chain partners too. "We talk to the supply chain about carbon and natural capital, but we speak to farmers about what this looks like in a practical sense so any sustainability programmes model what both want," he adds.

A key requirement is the sharing of data – Frontier strives to make that as easy for growers as possible via a simple form which provides around 80% of the information required to produce a carbon footprint, usually calculated using the Cool Farm Tool.

Some industry standard data can be used to fill most other requirements, but Frontier uses its agronomists alongside information from Greenlight, SOYL and MyFarm Analytics where appropriate, particularly around field operations – all with the farmer's knowledge and involvement.

"We have a number of financial mechanisms to support farmers to provide data," says Sarah. "That can be inherent in the contract, or a separate premium where there's usually an onus on providing more specific information, or for particular 'practice change' contracts where data is required to highlight the outcomes to the funder."

Frontier's biggest contract requiring data sharing involves up to 220 farms, while the smallest has just five growers. Having real life data helps drive change, stresses Sarah. "If you're just using average conversion factors the only way to make change as a buyer of crops is to reduce the volume when using a 'standard' emission factor of feed wheat – i.e. reducing the emission number by reducing the tonnes used. If we have a lower emission factor from better data, we can reduce the footprint in other ways.

"We can't just use averages – we have to understand what it means within specific supply chains and what levers we can use to drive change."

Global supply chains are further along in understanding some of these factors, she notes. "They recognise they're never going to achieve 100% primary data, but they know now what will make a difference."

Aligning data with those brands has partly pushed Frontier to use the Cool Farm Tool, which is widely used by such firms, but Sarah envisages grower data may end up being used in more than one calculator.

"While few contracts are large scale currently, we see that changing during the next few years. It just requires investment from the supply chain, how fast they're willing to go, and the percentage of their supply chain they want to involve.

"Smaller supply chains might want to involve 100% of their grain supply from farmers like a few of our customers, but if you have large volume grain flows from all over the country the approach may be different."

The data is also helping to change incorrect supply chain and government assumptions, proving that via some regions or practices farmers are already producing crops sustainably, adds Rob. "In that case, there might not be further action required as the farms are already efficient.

"Frontier's role is also about making sure data is used fairly and correctly. Supply chains aren't looking to use it to tell farmers what to do; through collaboration it's about developing the right incentives and understanding how we can support growers to make the right changes."

But farmers can't change incorrect narratives without engaging, adds Sarah. "And to do that there has to be more transparency with information." ■

Crop production insights

CPM would like to thank Frontier for kindly sponsoring this article and for providing privileged access to staff and materials used to assist with its creation.





“ You only have to look at the environmental catastrophes taking place around the world to realise we have to take action. ”

Food chain conference

Driving sustainability

A sustainability conference organised to discuss and debate topics around building a more resilient food supply chain has highlighted some clear strategies for the future.

CPM reports.

By Rob Jones

The food supply chain must prioritise collaboration across the industry and embrace new technology and data opportunities if it's to become genuinely resilient in the future, was the message to delegates at a recent sustainability conference.

Furthermore, the fundamentals of regenerative agriculture should be encouraged and integrated in all activities from field to fork and new benchmarks are urgently required to ensure sustainability targets are met.

Opening the conference, which was organised by Agrii, was sustainability and environmental services manager, Amy Watkins, who said major changes during the past ten years are shifting the landscape of food production.

“The UK leaving Europe arguably started the largest agricultural transition since the Second World War. Then, Covid-19 further disrupted supply chains globally and opened consumers' eyes to where their food comes from and the challenges associated.

“Food security and price volatility have become an even greater talking point since 2022, with war breaking out in Ukraine and this year's extreme weather further adding to the challenges,” she explained.

“Ongoing change is something our supply chain has to accept as a reality, and building resilience into all stages of food production is absolutely critical. Producing safe, nutritious and affordable food for a growing population is a priority for our industry, but so too is achieving positive environmental outcomes at all stages of the journey.”

The Agricultural Industries Confederation (AIC)'s Vicky

Robinson said outcomes were now becoming the basis of thinking about future sustainability, rather than implementation of one specific production strategy over another.

“The original definition of regenerative agriculture, for example, is largely practice orientated with specific



Ongoing change is something the supply chain has to accept as a reality, and building resilience into all stages of food production is critical, said Amy Watkins.

references to soil cover, minimal soil disruption, integrating animals and maximising crop diversity.

“That’s quite a narrow definition, particularly as it doesn’t mention desirable outcomes like improved soil health, greater biodiversity, protecting water, achieving integrated crop management and using more biological solutions,” she outlined.

Then, economic outcomes such as financial viability and food security are also essential to long-term resilience and much of the guidance around sustainability, such as SFI, is outcomes based, added Vicky.

“But this is just the start. The government, advisors and farmers all have to work together to create a new way forward with the requirements of consumers and all of those in the various stages of food production involved.”

Red Tractor’s Philippa Wiltshire agreed, saying the food supply chain can’t solve its problems by continuing to operate in sector silos, as it’s done traditionally. “For the scope 3 primary data challenge the industry requires a common framework that it can work to with greater emphasis on proof and evidence of sustainable practices across all areas.

“If British agriculture is to make public commitments around sustainability that consumers will hold us to, it requires the facts. Data is the key to this, whether it be from trials and research or at an individual farm level, but the supply chain has to get better at finding this data,” she said.

Phillippa believes this is easier in integrated systems such as in pigs and poultry because the complexity of the supply chain in arable production makes it challenging, but the sector has to find a solution to creating a single data hub that all can rely on.

“In addition, if farmers are to provide this data, they require the assurance it’ll be used to give them value and they’ll reap the rewards. Trust, quality and that assurance, plus transparency and honesty, are all required to make shared data work.”

Derek Wilson of Origin Enterprises pointed out that there’s no shortage of data in the industry, but how it works together is an issue. “Data can come from a number of sources and in different forms so there’s a large formatting piece which must be done if it’s to easily flow from one source to another, as well as ensuring security and privacy.



Peter Scott believes one of the most important benchmarks for delivering future sustainability is to focus on nitrogen use efficiency.



Peter Cartwright said NUE has proved essential in monitoring the Revesby Estate’s use of nitrogen.

Data aggregation

“Agrii is already aggregating data from multiple different systems such as that from tractors, combines and drones in the Rhiza Contour system, so we know it’s possible. Originally, farmers engaging with this were using it to largely improve profitability, but by definition, if you’re farming in this way, you’re adopting a more sustainable approach by using less inputs and knowing precisely the effect they’re having,” he said.

Agrii agronomist Todd Jex explained that the company’s extensive trials and R&D programme are contributing considerably to the collective data set to the benefit of all growers.

“What’s becoming increasingly clear is the importance of soil health in future sustainability. We’ve found growers moving to minimum tillage are saving around £100-£130/ha compared with those ploughing.

“They also have much healthier soils with better structure and resilience, and 60-70% of my farming customers now say they’re implementing a regenerative system of some type. But, it’s not for everybody. If you’re on really heavy soil it’s often impossible to direct drill and the yield losses through the transition period can make it almost impossible to stick with,” he said.

Todd continued by stating crop nutrition is another area where significant strides forward are being made. “Growers are desperate to reduce their reliance on synthetic inputs including inorganic nitrogen,

and there are numerous options opening up in terms of new chemistry, physical and biological approaches.

“Nutrient density of the food people eat is becoming increasingly important and plant nutrition has a big role to play in this too,” he commented.

According to Peter Scott, technical director at Origin Fertilisers, use of inorganic nitrogen fertilisers is the single largest component of the carbon footprint of crop production and any attempt to decarbonise food production will have to address this.

“In a typical combinable crop, 50% of the carbon footprint is related to the production of the fertiliser in the first place and the other 50% is due to in-field emissions. But, around half of human dietary protein consumed globally is directly related to the use of inorganic nitrogen and in the west, this would be much more. The issue of nitrogen use goes to the very heart of sustainable food production,” he said.

“Green ammonia, where the hydrogen element of ammonia comes from water rather than gas, could play an important role in the future with regard to reducing the carbon footprint of manufacture, but we must also address in-field emissions.”

Peter believes one of the most important benchmarks for delivering future sustainability is to focus on nitrogen use efficiency (NUE). “The higher the NUE, the lower the nitrogen loss, but you have to measure it to manage it.

“NUE changes from season to season, ▶



According to Jonathan Trotter, technology makes a vital contribution in delivering future sustainability.

“The idea behind the DTF is to understand how we can leverage and integrate different technologies to make decisions on-farm and see how they can enhance decision making compared with a traditional agronomic approach.

“So, for example, the Skippy Scout drone system can monitor above ground crop growth and information from this could be enhanced by data on below ground nitrogen levels from in-situ soil nitrogen sensors such as Plentysense nitrogen blades.”

According to Jonathan, this data can be combined with that from Soiltech Wireless soil moisture and temperature sensors dug into the ground, for example, and all the information collected can link to Agrii's Rhiza online Contour platform.

“Another system now being used is Fieldmate disease monitoring which can provide disease predictions for different crops based on climate, leaf wetness and other factors,” he said.

Moral obligation

To follow, Charles Tozer of Boortmalt emphasised that all links of the supply chain have a moral responsibility to deliver greater sustainability. “You only have to look at the environmental catastrophes taking place around the world to realise we have to take action. As far as we're concerned, that starts with our own business operations.

“But ultimately, the end of our supply chain is the consumer, so the drive must come from them and we all have to work together to deliver more sustainable products in the future.”

Angela Gibson of Viterra UK Ltd said collaboration was the key to achieving this, but urged caution. “We have to be careful to not import data if we can't protect it. Grain marketeers have an important function in collecting data and disseminating with traceability throughout the supply chain being essential.

“To move at scale, however, we have to move seamlessly across the industry with digital grain passports being essential in achieving this. They're the future and we require long-term commitment from AHDB or government to make these happen.”

“We require consistency and granularity so farmers get the benefits from the data they hold and it could be we have to look at a completely new set of standardised metrics across the industry to deliver this.”

Thomas Gent from carbon specialists

Agreena said farmers, as primary data holders, should be encouraged to collect and present their data properly while being educated as to its value.

“There's a lot of data out there but the real question is what does it all mean? We have to show the value of this data to farmers and help them to understand how to get the most from it. With regard to carbon opportunities, for example, farmers want both complete flexibility and for the food industry to commit to them long-term, so this is something we have to work at and resolve,” he commented.

Bill Angus of Angus Wheat Consultants believes genetics can play a big role in the future, but they're not the 100% answer. “Sustainable agronomy where genetics, chemistry and crop nutrition work together is the ultimate objective.

“We can't achieve the wheat yields we require without chemistry; yields would easily drop by a third and we'd end up with very poor quality crops. We should, however, move to de-risking varieties and raise our management standards as well as introduce greater diversity into crops from the wealth of plant genetics we can tap into,” he said.

Closing the conference, Amy invited all individuals and organisations committed to working with stakeholders and farmers in the development of a more resilient food supply chain, to build a dialogue with the company. “If you want to develop such areas further, we are very much here to support you.” ■



The conference was organised by Agrii and welcomed stakeholders from across the food supply chain.

► field to field and crop by crop, so it's no good using default average values or national levels. We have to get local and encourage growers to do this.”

Farms manager Peter Cartwright from Lincolnshire's 2400ha Revesby Estate, said NUE had proved essential in monitoring their use of nitrogen and has allowed the farm to better understand how other technologies could improve it.

“Nitrogen use is definitely a main element of our carbon footprint, but we're finding there are ways to manage it more effectively. Our own trials have shown the benefits of using Agri-Start Liquisafe, a nitrification inhibitor which holds nitrogen in the soil, for example, with some trials pointing to a 50% reduction in yield without the technology.”

Peter Cartwright is also achieving results from using biologicals in the early stages of crop growth to promote plant health and build green area. “And rotation is important too – we include peas and beans wherever possible to put nitrogen back in the soil and improve its overall health plus cover crops are increasingly being used.

“Aiming to produce high yield is an often overlooked element of reducing the carbon footprint of crops. A 10t/ha yield dilutes the carbon footprint per tonne produced considerably, compared with a lower one,” he added.

Jonathan Trotter, Agrii's technology trials manager, said technology makes a vital contribution in delivering future sustainability, with Revesby Estate being one of the company's first digital technology farms (DTF).



nature matters

by Martin Lines

Hopes for harvest and beyond

With a changing climate, the unpredictability of our weather has certainly been bad news for food this year and not for the best for farming. Predictions were always that it'd get warmer, but lately we're seeing the cold side of the weather fronts – it's anybody's guess these days.

As combines are revved up to dive into harvesting, it looks like it's going to be a harvest of the good, the bad, the ugly and the damn-right disappointing – and that's if you're lucky and managed to keep your crops alive over winter and spring.

What's the potential impact of one of the smallest wheat harvests for many years?

The quality of the harvest is going to be critical to add value. With so much spring barley in the ground across the country, the potential for good premiums on malting barley will be slim and much of it will probably end up in the feed bin, increasing pressure to the feed-wheat price. I think I can speak for most of us when I say we'll be pleased to see harvest completed and a new season start.

It's been hard during the past few months, seeing so many fields with bare areas, the light flushes of blackgrass and wild oats creeping in. As a result, some are going to find it very

difficult to manage their cash flow in the year ahead and to invest into next year's crop. If this is you, you're not alone; if you're under pressure, please reach out and speak to somebody. To those already gathering in their harvests: good luck, and I'm hopeful it'll be fruitful for you.

With many crops established in challenging conditions and fertilising/spraying applications made on sodden fields, there's a lot of soil damage that requires remedying. For some this means reaching for the plough or cultivator to disturb the soil, and for others it'll be targeted approaches for minimum disruption to the soil microbiome. The healthier our soil is, the more resilient it is to extreme weather impacts, and therefore more able to protect and nurture our crops.

We can only hope that harvest is over swiftly and at little cost, giving us a wide window for fixing soil health and drainage to prepare for what we hope will be an easy autumn for planting.

The issue of field drainage is becoming increasingly important for those of us on heavy land or whose drainage systems are coming to the end of their lives. Regular mole draining can keep things going but it's not a long-term fix. How we manage to invest in drainage schemes to keep our soils in good condition is going to be very challenging, but necessary to enable us to plan and harvest at the best times.

Investment in infrastructure is required for farmers – having access to government-backed funding that gives long-term returns and improvements

is becoming increasingly important. With many environmental challenges laid at the farmers' feet, we may have to draw upon support from SFI with which we can implement some improvements and be recognised for those we're already doing.

SFI actions such as tree planting and creating and maintaining hedgerows will support healthy soil drainage. However, how we invest in improvements at the same time as investing in production is still something the supply chain and government must continue to address.

Not only will there be a frenzy of activity in the countryside as harvests are reaped during the next few months, there'll also be a hive of activity in Westminster as everyone jostles to engage with the new Prime Minister, Secretaries of State, MPs and civil servants.

We can only hope the new government engages with farmers to discuss practical solutions for all

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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our landscape can produce and that society needs – which is by no means only food production. With much talk of new infrastructure development, access to the countryside and crop production may face many challenges in the years ahead. Let's hope the new government gives agriculture the support it requires and deserves, as we have much to offer in delivering nutritional security, climate change mitigation and nature recovery.



We can only hope the new government engages with farmers to discuss practical solutions for all our landscape can produce and that society needs.

Immersive learning

“ There’s a misconception that we should expect to see yield decline, but we’ve observed the opposite. ”



Groundswell report

Nine years of Groundswell festival and it continues to be a sell-out event. CPM joined the 8000 visitors at Lannock Manor Farm in Hertfordshire to hear this year’s hot topics, meet faces new and old, and take inspiration for the future.

By Melanie Jenkins and Janine Adamson

It’s questionable whether many individuals would receive roaring applause and whooping when they walked onto stage at an agricultural show or conference. However, that was certainly the case for Amish farmer, John Kempf.

Founder of regen agronomy consultancy, Advancing Eco Agriculture, John was billed by the event organisers as one not to miss. And although he had slots

throughout the two days of Groundswell, John first introduced himself during a session entitled ‘Untapped potential in regenerative ag’, which took place in the big top (the equivalent of the Pyramid Stage at Glastonbury).

Headline speaker

In many ways, it was quite a coup – being from Northeast Ohio, John rarely travels and this was his first time visiting the UK. But with an audience ready to hang from his every word, he opened his talk by stating many people don’t have an appreciation for what healthy plants do, because most haven’t observed it.

“To provide some context, I grew up on a fruit and vegetable farm where we’d receive 40” (around 1000mm) total accumulation of snow and rain, with up to 280 cloud cover days a year and high humidity – it was ideal for disease.

“At the same time, my father was a pesticide distributor so we’d be the first to test and evaluate new products as they were released. In the early 2000s, we lost around 70% of our primary crops due to issues such as mildews and blight. It seemed the more intense our pesticide use was, the worse the problem became”, explained John.

“It was a wake-up moment. Then, we rented some nearby land from a neighbour which hadn’t had the same pesticide use. The comparison was so pronounced it had our attention; we wanted to know why.”

During the following years, John said it became apparent that plants have the capacity to be completely resistant to pest and disease pressure if they have a good immune system and microbiome health. As a result, he believes it’s possible to grow resistant plants that aren’t susceptible to pests.

“Our approach is to achieve the highest yields possible but with a twist – healthy plants to produce the highest yields, but with robust immune systems and resistance to pests. There’s a misconception that we should expect to see yield decline, but we’ve observed the opposite. After all, how can you have healthy plants and see yield



Good root systems produce glomalin which is the glue that holds soil particles together and this’ll help water retention, said Odette Ménard.

decline?" he questioned.

John stressed that it's not a case of simply removing inputs, instead it's about earning the right to do so by improving plant health to a place where they're not required. "Plants with a robust immune system can transfer that immunity to humans and livestock while also regenerating soils and the ecosystem at the same time."

According to John, regenerating soils isn't always about replenishing them through added organic matter or cover crops, for example. To explain further, he highlighted the role of photosynthesis. "What's changed as a result of micronutrition and microbiome depletion, is a plant's photosynthetic ability has been reduced therefore the sugars it produces are compromised. These sugars go into the roots and are emitted as root exudates, and that's how to build organic matter.

"Crops don't have to be extracting from the soil and a change in agronomic approach can address this – reducing pesticides, improving soil health and growing food as medicine," he said.

Recognising that incentives are often required to instigate change at scale, John posed the question of how to deliver immediate economic results within the first year of operating with such an approach. "That became our focus, rather than undergoing a long transition or expecting productivity losses.

"For us, the foundation of regen agronomy lies in managing both nutrition and the soil microbiome. By doing this, it's a self-perpetuating system which doesn't require constant support or inputs," he added. "The only difference between a regenerative and degenerative cycle is you as the farm manager and the decisions that you make."

Perhaps a little controversially, John then pointed out that the widely-publicised principles of soil



According to Lydia Smith, fibre crops such as flax and hemp are exciting and have the potential to produce deep rooting structures that can improve the carbon content of soils.

health / regenerative agriculture are not a recipe to be strictly followed. "It's a foundation, yes, but in certain situations it's not possible to include it all. So we have to compensate, for example, if you can't have livestock within your system you could grow crops with more aggressive root systems."

But back to the point of how to achieve results immediately, consistently and reliably – John said a key component is measuring and using data, including in-depth soil analysis and SAP testing. "During the years of doing this, we've been able to correlate pest and disease pressure with nutritional status," he suggested.

And this topic was at the heart of another of John's Groundswell sessions which explored nutrition for insect resistance. To begin, he quoted soil fertility expert, the late William Albrecht: "Insects are nature's garbage collectors and diseases are her clean-up crew.' Pests don't turn up indiscriminately – the question is why? What is it about that crop or its environment?"

"When you take the conventional disease triangle (pathogen-host-environment), I suggest we've not given

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Attracting a packed out big top tent was Henry Dimpleby and Andy Cato who discussed transforming the food landscape at scale, can it be done? Discussions included questioning what it is the industry wants to scale, with Andy stating Wildfarmed is trying to achieve biodiversity-rich, food producing landscapes and therefore, it's time to back those who want to achieve both food and nature net gains.



NIAB is seeking useful genetics which may have been left behind in older wheat varieties, to bring forward as diversity-enriched wheat to be exploited on farm, said Phil Howell.

► enough consideration to the host. The immune status of a plant varies significantly, although being a 'host' doesn't mean it's susceptible to disease," explained John.

He then stated that due to how insects communicate within the infrared spectrum, nutritionally imbalanced plants are more visible and appear as 'neon lights' from a significant distance. And furthermore, he added in some ways, insects appear to eat plants not suitable for human or livestock consumption.

So what's the solution? John shared

thinking behind his plant health pyramid where at the base is complete photosynthesis which is achieved through 'proper nutritional balance'. "If we increase the volume of photosynthesis the sugar/carbohydrate profile changes – we get a high proportion of complex carbohydrates with low levels of non-reducing sugars in the plant sap.

"At this level, plants become resistant to soil-borne fungal pathogens, but they require adequate Mg, Fe, Mn, N and P to achieve it."

Protein synthesis

The next layer up in the pyramid is complete protein synthesis, where all soluble N compounds are converted to amino acids and complete proteins within a 24hr photo-cycle. "These plants are resistant to larval and sucking insects because these insects are incapable of breaking down complete proteins meaning plants are no longer a food source. For this, the plant requires optimum levels of Mg, S, Mo and B," said John.

The third pyramid level is increased lipid

Cut flower revival

Renowned for highlighting alternative approaches to agriculture, Groundswell thrust the concept of flower farming into the spotlight.

Olivia Wilson of the British Flower Studio Wetherly opened the session by stating there's a perception that flower farming is simply growing and picking flowers with a trug. "However, the UK cut flower industry's worth £1.4Bn and is a big business, but is currently lacking scalability and growers with professional mindsets," she said.

Calixta Killander founded Flourish Produce in 2017 – a 30ha site growing 750 varieties of crops including heritage grains, organic fresh produce and cut flowers. She said the business is based on an agroforestry model with crop stacking, allowing maximum output from the available land.

"We've tried to avoid wholesale so sell

direct to consumers, but the challenge here is improving the perception of what British flowers should look like and their seasonality/availability."

Anna Taylor from Anna's Flower Farm agreed that the future of flower farming is in stacking – layering perennial species and bulbs to reduce the time and investment required while respecting the environment.

But a purpose of the session was to highlight the opportunity to 'conventional' farmers and the benefits of teaming up with flower growers, rather than individuals embarking on the process from scratch. Following the panel session, there was networking to matchmake landowners with suitable flower farmers.

And judging by the audience's positive response, the benefits of flower farming for all parties were clearly conveyed.



The sun shone at Groundswell this year, attracting 8000 visitors to the site in Hertfordshire.

Loyal to the soil

Farming land at the edge of the Saskatchewan prairies on the Canadian border with the US, Derek and Tannis Axten, have fragile soils across 4850ha, with 30-35cm of rain per year. Having inherited Axten Farms from Derek's father, they adopted a no-till approach in the 1990s but found yields plateaued.

Unsure why this was happening, the couple began attending conferences with the aim to learn from others. It was the summer of 2006 when Derek met Dr Dwayne Beck, the grandfather of the no-till movement, in South Dakota, when things started to change. "I saw him again in 2007 and it was the first time I'd ever seen someone put a shovel in the soil," said Derek. "I'd studied agriculture at college and this was still all new to me, and I could see that this soil didn't behave how ours back home did at all."

He returned to South Dakota a number of times and on one occasion was tapped on the shoulder by none other than Gabe Brown, who subsequently invited him back to his farm. "At Gabe's farm I saw that his soil was entirely different to soil just 200m away, with the latter just like the farm at home. This was the moment that changed my life because I knew I had to alter the management of the farm."

One of the key ways to learn how to manage land is to look to the native system as a model, said Derek. "For us, that means the prairie, where 85% of the plant life is grasses, the rest is legumes and the rest is forest, which is all live root and permanent cover – so these are the soil health principles now in our model."

With a background as a high school biology teacher, Tannis was interested in learning more about what was going on in the soil and so took a course to be able to identify microbes in 2017. "It was really disappointing because I just found lots of bacteria. We'd been making lots of changes but to see no healthy biology was really sobering."

"This is when we decided to make our farm motto, 'loyal to the soil'. Every decision we now make on the farm, we look at how



Derek and Tannis Axten farm 4850ha at the edge of the Saskatchewan prairies on the Canadian border with the US. Their session was entitled 'loyal to the soil'.

it would impact the soil biology, whether it would be harmful at all and what we could do to make up to that. It's a long process and means our approach constantly changes but we focus on low disturbance, nutrient balancing and diversity, and work with our agronomist to be proactive rather than reactive."

Derek is a keen experimenter and so is self-proclaimed to have owned basically every single and double disc drill available in Western Canada. "There was always something wrong with them but we've landed on one we're pretty happy with in the form of the K-Hart 18m double disc off set drill," he said.

The couple now leave cover on the soil which provides moisture retention and soil biology, and they've also introduced controlled traffic farming. "We generally try to do everything we can to get as much aeration into the soil."

"We were the first farmers in Western Canada to introduce a chaff deck to the farm," explained Derek. "This is a divider on the back of the combine which captures the heaviest portion of the chaff that's full of weeds and would usually go on the field, but is instead dropped into the tramlines. One of our biggest fears with CTF was trampoline

erosion but this mechanical weed control which doesn't take any horsepower or diesel, is low impact and easily solves the problem."

The couple have also worked to reduce their reliance on synthetic inputs, using green-on-brown spraying technology with their Agrifac sprayers, and also have dynamic dosing for variable rate per nozzle. "We used to apply 10,000 litres of herbicides and now we only use 950 litres," said Derek.

To maximise diversity, about 14 different crops are grown on the farm, some being intercrops. "There was so much diversity in what Gabe grew and it all looked so good without any fertiliser on it, and this really stuck with me."

Further to this they've introduced pollinator boundaries, have introduced perennials, utilise livestock grazing and now SAP test, as well as apply micronutrients and biologicals.

Tannis highlighted that they hardly use any nitrogen now. "It can be hard not to panic when you're seeing your neighbours applying it, so try to be confident in what you're doing. We still have some years where we feel things go backwards, but you have to be out there with a shovel to see the changes."

synthesis (fats and oils) which is related to a plant's waxy leaf surface and achieved through an aggressive microbiome. "When a plant absorbs the majority of their nutrition in the form of microbial metabolites, which are very energy efficient, any surplus energy is stored as lipids. This waxy layer can serve as a shield from airborne fungal and bacterial pathogens."

At the top of the pyramid is increased plant secondary metabolite synthesis

(essential oils). "Immunity pathways are triggered by microbes in the plant's microbiome meaning they become resistant to the entire beetle family as well as nematodes. To achieve this, plants require the right microbes in the microbiome," explained John.

Taking a more simplistic perspective, he stated that the bottom two levels are based on balanced chemistry whereas the top two are about active

immunity and vigorous biology.

It could be argued that in one way or another, everything leads back to the soil, and this was certainly the focus of Odette Ménard's seminars at Groundswell. An agricultural engineer, Odette has travelled the world to learn how to best create healthy soils for the long-term. "When we talk about agriculture, it's often about what we see on the surface, but what we see here

A stalwart on stage

Undoubtedly a familiar face for many *CPM* readers, weed researcher, Dr Stephen Moss, took to the stage to share his thoughts on managing blackgrass within arable rotations. With more than 250 research papers under his belt, unsurprisingly, spare seats in the audience were limited.

As a means of condensing his expansive knowledge into easy bitesize chunks, Stephen discussed five key aspects of blackgrass, starting with its seed longevity in the soil. "When soil is disturbed through cultivations, we can expect a 80% decline in the seedbank per year, but of course this may consist of 50,000 seeds/m². If seed return is reduced, populations should decline," he explained.

Then, Stephen discussed the fact that blackgrass can only emerge from the top 5cm of the soil profile, therefore, cultivations are important in managing the weed. "This includes plough resets or rotation ploughing,"

he stated with some reticence, which he said was due to Groundswell's target audience.

Point three was emergence patterns: "For blackgrass, 80% of emergence is in the autumn which is why spring cropping and delayed drilling/stale seedbeds are effective control methods."

To follow, Stephen pointed out the role of shedding in blackgrass. "Seed is shed from mid-June onwards, with 95% being lost by harvest. That means plants should be hand-rogued or sprayed off before this date, given heads appear in May but aren't viable," he said.

To conclude with point five, Stephen highlighted the population dynamics of blackgrass. "Populations can increase 10-fold per year with more than 95% control required to prevent the build-up. However, herbicide resistance is becoming a problem worldwide.

"All-in-all, an integrated strategy is key for a long-term approach to



As a means of condensing his expansive knowledge into easy bitesize chunks, Dr Stephen Moss discussed five key aspects of blackgrass.

blackgrass management," he added.

"All of the above values are averages and it varies field to field. Every farm is different, there's no magic bullet."

Stephen was joined on stage by ADAS's Lynn Tatnell and Althorpe Estate's Garth Clark.

▶ doesn't show us what's really happening, so we have to get into the soil profile."

And what's going on below the surface has a huge impact on water, so during a rainfall simulation display, hosted by Affinity Water, she focused on the ability of healthy soils to retain water and prevent run-off compared with poorer soils.

"Soil run off starts when the amount of water accumulated on top of the soil is raised to half the diameter of a raindrop, so it doesn't take a lot of rain for run off to start.

"The first thing we want water to do is infiltrate soil, but any water that runs off won't be infiltrating it to supply our plants. This is where we introduce some kind of cover in our fields, but we also require a root system that will impact water infiltration by creating structure and stability in soils.

"Good root systems will produce glomalin which is the glue that holds soil particles together and this'll help water retention. So the more cover you have, the less run off and the greater the root

systems the better the infiltration."

Also contributing to the rainfall simulator session, John Kempf, founder of Advancing Eco Agriculture, pointed out that one of the best ways to measure soil health is its aggregation and not just in the top 15cm, but at depth. "The healthiest soils will have deep soil aggregation to 1m deep and this revolves around how rapidly and efficiently water infiltrates and percolates – these soils will facilitate microbial delivery of nutrition, and in order for this to happen, it requires constant small doses of water – think of it as a sub-aquatic environment." [This subject will further be explored by *CPM* in an article on soils in its August issue].

More diversity

To target better soil health, NIAB's Lydia Smith advocated the use of more complex farming systems by including greater diversity. She noted that if growers can't run livestock on their farms, there are tools at hand to bring above and below ground benefits through introducing different crops.

"Fibre crops such as flax and hemp are hugely exciting and have the potential to produce deep rooting structures that can improve the carbon content of soils, and you can generate saleable products from these crops, plus they can be grown across the UK. The next challenge is developing infrastructure around crops like these."

Although introducing diversity of plant species can aid soils and biodiversity, there's still significant demand for wheat



*During an interactive session led by entomologist Dr Kelly Jowett, Rothamsted Research gave audience members a copy of the institute's latest farmland carabids identification guide. The aim is to give farmers tools to monitor the beneficial beetles to help understand if the sustainable actions they're undertaking are being successful. Read more about carabid beetles in the December 2023 issue of *CPM*.*



It's been revealed that Groundswell 2025 will be taking place on 2-3 July.

to be grown in the UK, so how can diversity be introduced to this monocrop? NIAB's Phil Howell has spent his career looking at wheat and the genetic diversity of the base material and how this can be selected to introduce resilience to plants and help reduce reliance on inputs.

"In terms of evolutionary history, wheat starts from a narrow base where two different grass species crossed 10,000 years ago, and domestication has involved selection for certain attributes that make wheat a crop and not a weed. And more recently, plant breeding has intensified selection, so at NIAB we're seeking to look at what useful genetics may have been left behind in older wheat varieties, to bring these forward as diversity enriched wheat that can be exploited on farm."

Professor Giles Oldroyd of the University of Cambridge sees gene editing as one of the answers to bringing greater genetic diversity to farm. "There are traits we've completely lost from our crop plants because we haven't been intentionally breeding for them – these are orphaned traits. So we have to adapt our crop plants to

a regen farming system to maximise their performance in this system. But we have to be delivering crops for the requirements of this country and the globe, which will involve bringing in genetics to maximise performance."

To do this, Giles advocates gene editing as a way of rapidly introducing critical traits suited to regen farming. "Gene editing is an extraordinarily valuable and revolutionary technology that's transforming the natural sciences and I think we're foolhardy as a community if we don't embrace it to improve our crops out of fear."

But speaking on a panel exploring the idea of a new cereal seed system, Dr Ed Dicken, lecturer at Harper Adams University, pointed out that changes to the seed breeding system could be beneficial to farmers. "When people grew landraces these required low to no inputs, whereas modern wheats are designed for more intensive systems.

"Growing one variety is like everyone having the same lock on their front door and wondering why everyone can break in – whereas diversity builds in resilience." ■

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

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“The words ‘food security is national security’ have been used by all political parties, but words don’t keep people fed.”

Focus on

Cereals Event report

food production

Farming has faced an incredibly trying season, but this year’s Cereals Event proved there’s still plenty to be positive and optimistic about, whether it’s a change in the administration, progressive breeding or the wider adoption of precision technologies. CPM reports.

By Melanie Jenkins

The sentiment at this year’s Cereals Event, held at Bygrave Woods in Hertfordshire last month, was very much one focused on the impending general election (although by the time CPM lands on doorsteps, this will have been decided).

Opening speaker, NFU chairman, Tom Bradshaw, noted that although the public purse is under huge stress, it’s vital the incoming government values the importance of investing in the future of farming.

Currently, £2.4Bn is committed to support farming – a figure that’s been consistent since 2005. But compared with today’s value, it’s only worth about one third of that in real term value, highlighted Tom.

“UK farming requires £5.5Bn, a figure that’s been determined by Andersons, and I understand that the public purse is under pressure, but we have to decide what we prioritise and how much we want to deliver the twin ambitions of sustainable food production alongside environmental delivery. If we purely focus on the environment, then we’ll fail on food production.

“The words ‘food security is national security’ have been used by all political parties, but words don’t keep people fed. If we’re serious about food production, we have to underpin this with policy.”

Government priorities

Tom flagged that the roll out of the Sustainable Farming Incentive has been very welcome, but asked where the priorities of government lie. “Where does food production fit into this? You can’t take the amount of land out of food production which will be removed by SFI, and expect there to still be the same amount of food produced. One of our key asks of the new government will be to publish impact assessments for policy that’s being developed, the expectations they have, the viability for farm businesses and the impact on food production.”

Taking responsibility will be essential for any policy, added Tom. “If we do end up with a government that takes an ‘out of sight, out of mind’ attitude towards imports, and which is happy to use other resources from around the world to feed the UK population, then we’re going to have a huge challenge.

“Our import standards have to reinforce

our domestic ones – it’s not about protectionism, it’s about fair trade rather than free trade. If we’re serious about solving the world’s problems, we can’t simply offshore our production to other parts of the world.

“With 70M people living on our island, I think this gives farming an opportunity to feed them with high quality British ingredients. Imports will always be part of food security but having a strategy for domestic food production as a critical part of resilience of feeding these people should be a priority for government.”

Tom is keen to see the new administration properly roll out the Farming Recovery Fund so that it encapsulates as many farmers as possible, but he fears it could be viewed as the previous government’s



Tom Bradshaw noted that although the public purse is under huge stress, it’s vital the incoming government values the importance of investing in the future of farming.



According to Brin Hughes, food brands are increasingly asking for the origins of the oats they buy, whether they're low carbon or not, what the greenhouse gas emissions are, and if they've been grown regeneratively.

trading at a premium to other markets and there's a lot of demand for Canadian canola oil in the US for biodiesel."

But when it comes to cereals the anticipated difficulties of moving exports out of Ukraine have proven far less of an issue than expected, said James Bolesworth of CRM AgriCommodities. What growers have to consider is the influence that higher interest rates will have on the market. "From the perspective of investors, they're far more likely to invest when rates are lower than they are now. We anticipate rates might fall from September, but this could change and make it less attractive for investors to buy commodities, so should be considered."

Role of Russia

In terms of fundamentals, James flagged that 25% of global wheat production

originates in Russia. "Russia has declared a crop emergency in 10 different regions with production down from 100M tonnes to 80M tonnes, which even the grain fill period is unlikely to help this recover. And in Turkey, exports have been banned for the next four months."

Looking at stocks relative to demand, supply is continuing to fall, he said. "The ratio is the tightest we've seen going back to 2008, but there'll be a limited ability for prices to rally because of interest rates."

However, he advised growers to watch for shifts in weather patterns as the El Niño phenomenon shifts to La Niña as this will play a key factor going forward.

The milling wheat situation has been no less tumultuous with Cefetra's Chris Wood describing the past couple of years as 'crazy'. "Our overall domestic

plan. "The extra £49M was welcome and we hope the new administration will see the fund as depoliticised."

But on a more positive note, the NFU launched its latest #YourHarvest social media campaign on the first day of the show to highlight the challenges faced on arable farms after 12 months of difficult weather conditions, explained NFU combinable crops board vice-chairman, James Mills. "The campaign is so important because we have to emphasise the challenges on farm but also look forward to work in partnership with government to tackle the volatility and ensure there's resilience in the sector."

But whatever the industry sees in terms of agricultural policy under the incoming government, tactical grain marketing remains as important as ever, as was highlighted during a seminar exploring global grain markets and UK prices.

Looking at the oilseed rape market, the current situation may see the UK crop at an 80-year low of 800,000t, said United Oilseeds' Owen Clegg. "The UK demand is 2M tonnes, and although prices have fallen from the recent highs of £400/t, they're still at £370-£375/t ex-farm at present."

There's also likely to be a deficit in supply comparative with demand in Europe, with production estimated at 18M tonnes, whereas crush demand sits at round 25-27M tonnes, he explained. "This has resulted in an interesting scenario, with one of the main import/export destinations is Ukraine which has quite a few logistical issues and growers that tend to be price takers.

"The other major producer is Canada which can produce up to 20M tonnes," he said. "But Canadian OSR has been

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Profit from our knowledge



A seminar panel discussed the potential for plant breeding to produce varieties suited to more sustainable and regenerative practices. Right to left: Katherin Hamlyn, Harry Barber, Anthony Hopkins, Bill Angus and Kim Hammond-Kosack.

► wheat demand is around 14M tonnes, so there'll be a deficit this year."

But what about risk management? "There's a lot more volatility in our markets and it's important to emphasise that operating in any market is incredibly difficult – traders and analysts are wrong all the time," he acknowledged. "So understand your business and what you're likely to achieve from a marketing

perspective, know your tolerance to risk, and be aware that you can make the right decisions but still be wrong in the market.

"Spread your risk by using a trading company, get a professional voice, use a harvest pool or trackers which sell when prices are X-% above cost of production," he added. "Just tailor your risk management to meet your business and aim for a solid price because trying

to outperform the market is hard."

If outperforming the market is so difficult, could growers consider other options such as green premiums? According to Richardson Milling's Brin Hughes, food brands are increasingly asking for the origins of the oats they buy, whether they're low carbon or not, what the greenhouse gas emissions are, and if they've been grown regeneratively.

"It's long been known that intensive agriculture is linked to biodiversity loss so there's awareness among brands of this and they want farmers to transition to be more sustainable."

But does this pay for farmers? Brin noted that firms such as Huel and PepsiCo (which owns brands including Jordans and Ryvita) are paying a premium for oats with the LEAF accreditation, and Richardson itself is working with Cefetra to establish a carbon payment for farmers.

It's not just food brands which are pushing for greener production but the wider supply chain. Charles Tozer, general manager of Boortmalt and chairman of the Maltsters Association of Great Britain, said the industry wants to see significant and sustained improvements in energy and water consumption within the sector.

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For Simon Penson, the key focus for reducing carbon emissions in the supply chain is at source.

“We’ve our own sustainability strategy as a sector that can collaboratively improve the carbon footprint and environmental credentials of producing malt, something customers and consumers are demanding from us. We’ve recently signed a deal with Cefetra to buy reduced carbon malting barley and are looking at all our suppliers to see what can be done to reduce the carbon footprint.”

Sustainable production

For Simon Penson of ADM Milling, the key focus for reducing carbon emissions in the supply chain is at source. “About 90% of our carbon emissions come from the wheat we purchase because although flour milling is an energy intensive industry, most of the supply is from renewable sources which is why sustainable agriculture is so important to UK flour millers.

“We’re working with major food businesses such as PepsiCo and Carlsberg, and have launched a programme to work with a group of farmers to help them introduce regenerative practices and make sure we have sustainable wheat growing systems for the future.”

But what about crop breeding, and is there potential in this increasingly vital tool to produce varieties suited to more sustainable and regenerative practices? BSPB’s Anthony Hopkins highlighted the organisation wants farmers to have access to the best varieties to fit their systems so they can grow profitable crops, but the industry is currently facing multiple challenges.

“Fundamentally, the challenges are down to Brexit and how the government has reacted to it, specifically in terms of trade barriers. Seed breeding is a global

business and anything this country does to make it harder to move seed around makes it more difficult for anyone wanting to grow crops,” he explained.

Prior to Brexit, varieties could be listed anywhere in Europe and be grown in the UK, but now have to be nationally listed here. “UK growers now get varieties later than those in Europe and because the market in the UK is smaller, breeders don’t always see the cost of bringing varieties here as being worth it.”

Despite these challenges, breeders such as KWS have made headway in producing varieties better able to withstand difficult growing conditions. “One of the main areas of progress we’ve made is in untreated yields,” explained the firm’s Henry Barber. “In 2003, 26% of the varieties on AHDB’s Recommended

List had untreated yields of about 80%, but as of 2024 it’s 76% of varieties.”

A further area of focus has been grain quality and how to achieve protein while maintaining yield. “Trying to balance the two has been more challenging for breeders and we get asked if there’s enough genetic diversity out there.”

Arguably an area of both concern and curiosity, genetic diversity can divide opinions but independent wheat breeder, Bill Angus, highlights there are already multiple germplasm in the varieties being grown. “Breeders produce millions of combinations a year and there are introgressions that are basically wider crossed which have been a route forward to higher yields. We aren’t short of genetic variation, there’s plenty out there, for example, orange wheat blossom midge

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Advances in breeding offer greater options every year with Elsoms' George Goodwin flagging that varieties such as Blackstone provide growers with the option of growing a feed wheat that could also go into distilling or for export.



One of the main areas of progress plant breeders have made is in untreated yields, explained KWS' Henry Barber. "In 2003, 26% of the varieties on AHDB's Recommended List had untreated yields of about 80%, but as of 2024 it's 76% of varieties."

► resistance came from a Russian variety.

"What we do have to do is rebalance the equation between breeding and chemistry, because if we took the chemicals away then we'd see yield reductions of 25-30% in wheat alone."

To overcome the challenges breeders face in producing more resilient varieties, Bill would like to see more high quality and diverse trials. "I don't think this requires more investment, just better use of it. There also has to be less regulation and greater flexibility because we're currently struggling to introduce forage oats to the UK because there's no system in place to allow them.

"And yet forage oats are a low-cost environmentally friendly opportunity for UK growers, something that'll benefit them and avoid the high cost of hybrid crops."

Available opportunities

Advances in breeding offer greater options every year and there are opportunities to be seized with Elsoms' George Goodwin flagging that varieties such as Blackstone provide growers with the option of growing a feed wheat that could also go into distilling or for export.

"A soft Group 4 wheat, it has one of the most flexible sowing windows from 1 September but is also an option if you have late lifted sugar beet and want something that'll go in from the end of October into December, with even the option of January/February drilling."

Achieving 103% for its treated yield on the RL, Blackstone scores 9 against yellow rust, 6.2 for septoria and 6 against brown rust. "It offers lots of agronomic benefits and growth-wise it's steady paced in autumn



Amazon's Simon Brown, who's retiring from his post as managing director this year, is as enthusiastic and optimistic for the future of agriculture as ever.

and picks up later on, allowing growers to keep on top of their spray programmes."

Looking to provide barley growers with increasing opportunities, KWS has launched its first hybrid, Inys. Achieving 109% of control, it scores 7 for mildew and 6 for brown rust, rhynchosporium and net blotch, explained the firm's Kate Cobbold. "In both of Inys' National List testing years we haven't seen any occurrences of lodging and it has a key attribute of lower brackling than other varieties on the RL."

It's not just plant breeding that is helping to drive the green revolution in agriculture, but almost as a juxtaposition, so is machinery. Yet investing in technology with benefits such as improved precision can be expensive and it can be difficult to quantify the environmental benefits.

Speaking at Cereals, Stephen Howarth of the Agricultural Engineers Association, said a US study conducted recently evaluated the potential benefits of precision technology, auto guidance/GPS, section control, variable rate applications and machine/fleet analytics.

He detailed that technology was shown to benefit farmers in four main ways: through productivity, improved soil health, better water and air quality, plus through emissions savings.

During the study, benefits were split into those already seen and what could be possible if uptake increased to 'optimal' levels, he said. "Up until now, there's been about a 4% yield increase from the use of precision technology and this could rise another 6% in an optimal scenario.

If we could achieve this in cereals and OSR yields in the UK, we would see an increase in production of 1.5M tonnes on the same area of land that's currently used. Or output could remain the same while we released 200,000ha of land for other uses.

"But the uptake of precision technology in the UK is around 35-45%, whereas in the US it's more like 50-60%, with people not adopting it because they see it as too expensive or not relevant," added Stephen.

New Holland's Nigel Honeyman observed that precision technology is also no longer about the single implement



New Holland's Nigel Honeyman observed that precision technology is also no longer about the single implement or machine, but about compatible and connected farming.

or machine, but about compatible and connected farming. "In precision farming, everything has to link up to make it future-proof and sustainable. We're no longer talking about pieces of hardware on their own but a whole ecosystem of products surrounding it which are all related."

And while he noted there are now numerous ways to collect useful and informative data, it's of no use by itself. "For data to serve any purpose you have to be able to action it, otherwise it's worthless and you might as well not collect it. And we've often been lackadaisical about how we use and store data on farm, but if you lose it then you're back to the basics again."

Data use

Further to this, he flagged the value of understanding the data and knowing when, where and how it will be useful. "For example, grain quality analysis doesn't work for everyone. For those chasing quality premiums it has value, but for those just after yield, it might not be relevant to you."

Amazone's Simon Brown, who's retiring from his post as managing director this year, is as enthusiastic and optimistic for the future of agriculture as ever. He pointed out that a lot of precision technology is now established but the next push is to achieve plant-by-plant application to drive down environmental impacts, reduce costs and improve time efficiency.

He also observed how quickly this technology is improving, highlighting that in 2007, fertiliser spreaders had six section control, but this is now at over 100 sections. "With 128 section shut off on a spreader, there's a 10% saving in fertiliser use compared with manual

shut off which is a vast amount of money saved which can then be reinvested."

But it's not just technology to reduce inputs that has an environmental benefit, spreaders can be fitted with radar to watch spread patterns and monitor any changes to bring the application back to being accurate, he explained. "Machines can also check changing wind speed and direction and make alterations accordingly – it's all about putting inputs exactly where they're required."

Simon feels that farm machinery will change more in the next five years than it has in the past 25. "Autonomous vehicles bring so much more potential to farming, where output is achieved through efficiency not width. But we have to be allowed to remotely spray and remotely refuel to achieve this." ■

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“The plough is still a vital tool in the cultivation strategy for many farms.”

Cultivators and ploughs

Soil preparation

Soil preparation provides a multitude of benefits on farm, but having the right machine for the job can make all the difference. *CPM* explores some new machines that can help towards achieving the ideal seedbed.

By *Melanie Jenkins*

It's coming up to that time of year where cultivators and ploughs are often used more than any other, playing an essential role in getting soils prepped and ready for the coming season. Here's a look at some of the latest releases from manufacturers.

Amazone

Ahead of Agritechnica 2023, Amazone launched a raft of new cultivation and plough products to suit a wide range of systems. One such machine is its new Cenio 4000-2 folding, universally adaptable mounted cultivator.

The three-point linkage mounted Cenio is a three-row mulch cultivator which can be used universally by interchanging of the various shares at depths from 5-30cm. As a result, the cultivator can be used for both shallow stubble cultivation as well as medium-deep and deep-loosening soil tillage. With a tine spacing of 30cm, the Cenio works without any blockages, even where large amounts of crop residues prevail, and evenly mixes the organic matter into the soil. A disc element with

fine-serrated, 410mm diameter concave discs is available for levelling the soil behind the tines and there's a choice of seven rollers for reconsolidating the soil.

Amazone also released the Catros+ 03 compact disc harrows in working widths from 4-7m with the Smart Frame System. In parallel, the trailed TS variant with bogey chassis is also available. The Catros is designed for shallow and intensive mixing soil tillage.

The intelligent Smart Frame System concept is user-friendly, and this new form of working depth adjustment means the machine has to be aligned parallel to the field surface only once.

Looking at ploughs, the new Terres 300 stepped adjustable plough has manual furrow width adjustment and an extension of the SpeedBlade plough body range.

These provide a solution for farms which don't wish to adjust the furrow width in the field. It comes with four, five or six furrows with variable furrow width adjustment or manual furrow width adjustment for tractors up to 300hp.

Amazone has also launched its Tyrok 400 semi-mounted reversible plough for on-land ploughing. The Tyrok Onland provides a high level of flexibility as a result of the quick and easy change between on-land or in-furrow operation. The new models are offered with a choice of seven, eight or nine furrows for tractors of up to 400hp.

Horsch

Horsch has launched a wide range of updates and new models to its cultivators which were first shown at Agritechnica. "As always, our goal is to provide the machinery that enables farmers to work the way they want to – adapted and developed to meet the requirements of UK farmers," says Horsch UK's Stephen Burcham.

The firm's new Joker RT has been designed for stubble cultivation, mixing of harvest residues and efficient seedbed preparation. It produces a high amount of fine soil in the germination horizon and can handle large amounts of straw, organic fertilisers or catch crops with a disc harrow at 12.25m working width.

The new 9m Cruiser XL is aimed at shallow tillage, stubble cultivation and straw distribution after the combine. It includes new FlexGrip tines which are pre-stressed with a 180kg release force to help maintain a precise working depth even in difficult conditions.

The six-bar design provides mixing and levelling at a maximum working depth up to 15cm. The 17cm tine spacing optimises mixing and crumbling on the surface and the packer options can suit working in wet and dry conditions.

Horsch's Fortis AS is a completely new generation of cultivators from the firm, designed to meet the demands of larger tractors and offer more variety for working depths. It has a maximum working depth of 30cm, suited to deep loosening and primary soil cultivation. The working width of 8.75m from tine centre to tine centre permits high work rates in combination



Horsch's new Joker RT has been designed for stubble cultivation, mixing of harvest residues and efficient seedbed preparation.



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The four-bar design of the machine allows for 27cm tine spacing, with the fourth bar extended to the rear so there's always enough loose earth in front of the levelling tines to achieve better results.

Kuhn

Kuhn has expanded its range of folding power harrows with two new 6m models and a 5m unit aimed at operators looking to increase outputs and make transitioning between fields quicker.

For the first time, the HR 1030 R range features folding machines, with the HR 5030 R and HR 6030 R becoming the new flagship models in the range and suitable for tractors up to 350hp. They join the existing rigid models from 3-4.5m. A 6m HR 6042 R model suitable for tractors up to 460hp



For the first time, Kuhn's HR 1030 R range features folding machines, with the HR 5030 R and HR 6030 R (pictured) becoming the new flagship models in the range and suitable for tractors up to 350hp.

joins the larger 7m and 8m models in the high output folding power harrow range.

The firm has also introduced a 12.5m version of its Optimiser disc cultivator that's

been designed to work with controlled traffic farming systems (CTF).

The new 12500 L joins the existing range of Optimiser cultivators, which start with the 3m mounted model. It features 100, 510mm discs arranged across two rows for working depths of 3-10cm and a Double U 550mm diameter rear roller for flexibility to cope with a wide range of soil types.

Kuhn's Edd Fanshawe says the new models will help large scale farmers reduce compaction. "The Optimiser range combines intensive mixing at high speed with easy adjustment to suit conditions. The new machine offers CTF users a stubble cultivator that can slot easily into existing systems and contribute to significantly lowering the number of wheelings during a season."

A tilt correction system that aligns the working angle of the plough to maximise the available tractor power and increase work rates is part of several updated features on Kuhn's Multi-Leader XT plough range.

According to Edd, the tilt correction system will increase working efficiency. "Tilt correction allows ploughs up to nine furrows to align with the tractor's pull line. The system will help users achieve the most efficient ploughing operation, especially when combined with GPS. The plough is still a vital tool in the cultivation strategy for many farms and even growers who previously turned away from ploughing are now using one in a targeted way."

Lemken

Lemken has introduced the 10m wide Rubin 10 to round off the top end of its range of the Rubin compact disc harrows with a large disc diameter of 645mm. Like the smaller Rubin 10 models with up to 7m width, the Rubin 10/1000 has a symmetrical disc arrangement for fuel-efficient operation without side draft.

This new compact disc harrow can be hitched via a ball coupling or drawbar eye, and hydraulic support is available to make attachment and detachment easier. The two rows of serrated concave discs are designed to allow thorough incorporation across the full surface width from a soil depth of 7cm. The 14cm line spacing should ensure blockage-free work even with large volumes of organic matter. Each concave disc of the Rubin 10/1000 is equipped with an overload protection with damped kickback, to reduce loads on the frame.

Its working sections feature a pendulum-type suspension to ensure optimal following of the field contour. On very uneven terrain or when working on slopes, the optional iQ-

Karat 10 intensive cultivator

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The **Karat 10** is designed even more efficiently, ensuring that it requires extremely low tractive forces. It mixes soil intensively, can be equipped with **DeltaCut** coulters for ultra-shallow tillage and therefore always delivers optimal work results in a wide range of conditions.





Lemken has introduced the 10m wide Rubin 10 to round off the top end of its range of the Rubin compact disc harrows with a large disc diameter of 645mm.



Developed as an option for minimum disturbance seedbed preparation, the Ecomat shallow plough offers mechanical control of pests and weeds through soil inversion.

Contour pendulum compensation should provide optimum surface adaptation. In addition, the hydraulic depth adjustment makes it possible to respond to changing conditions and the working depth can be changed while driving. During the turning process, the implement is supported by the roller, which has been fitted with strong bearings. Its wide contact area should help to minimise soil compaction.

For transport, the machine is folded from the cab with the roller's patented folding system ensuring the width is

reduced to 3m and the height to 4m to meet the requirements for road transport throughout the EU, and is approved for speeds of 40km/h.

Kverneland

Kverneland UK has extended its Ecomat shallow plough range with smaller models suitable for in-furrow use. The new versions are available in six-, seven- and eight-furrow builds, and join the existing eight- and 10-furrow on-land models.

Developed as an option for minimum

disturbance seedbed preparation, the Ecomat shallow plough offers mechanical control of pests and weeds through soil inversion, reducing the reliance on chemical methods.

"Ecomat is a half-way house between a plough and a cultivator," explains Kverneland's Adam Burt. "As a shallow plough, it still turns soil over but without the requirement to work as deep as a traditional plough.

"We're achieving 95% inversion at a depth of 9cm with an implement that's easier to pull than a traditional plough, while doing a far better job of inversion than a cultivator," he adds.

The arrival of in-furrow models aims to bring high-efficiency shallow ploughing to lower powered tractors. Working depths are from 6-18cm, and auto-rest leg protection is fitted as part of the standard specification. An HD spring pack is available for tougher ground conditions.

Available with plastic or steel bodies, furrow widths can be from 25-45cm thanks to hydraulic variable width. This gives the in-furrow models a range of working widths from 1.5m up to 2.7m, from 1.75m up to 3.15m and from 2m up to 3.6m. ■

Here's a 'Smart' idea

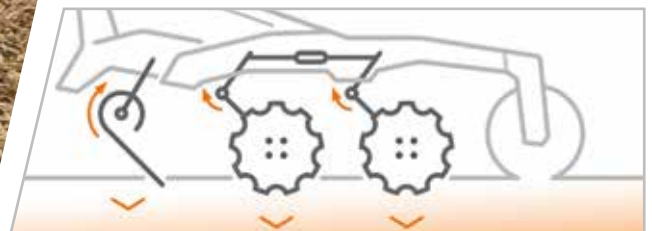
A disc harrow that's so simple - you just set it and forget it



The Catros compact disc harrow comes in range of working widths from 2.5 - 7 m mounted and up to 12 m trailed. The new third generation models now integrate the **Smart Frame System** for even easier working depth adjustment. This new form of adjustment means that the machine needs to be aligned to the field surface only once.

The low pulling power requirement combined with high speeds provides high work rates with low fuel consumption. With a disc diameter of 510 mm, the Catros⁺ permits working depths from 5 -14 cm and with the X-Cutter disc, an even shallow working depth of 2 - 8 cm is possible.

Option front tools such as the knife roller also make the Catros ideal for shredding large amounts of organic matter such as rape, sunflowers, maize stubbles or catch crops.



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The plastic problem



“The cost of recycling currently lands entirely on farmers’ desks.”

Balers

Plastic use in modern farming is unavoidable - its uses are many and varied. But more often than not it isn't recycled, creating a large and growing problem that one organisation is trying to tackle. CPM unravels the details.

By Melanie Jenkins

Plastic has almost become a dirty word in any industry, with pressure mounting to cut its use, increase recycling and take a conscientious approach to its disposal, but it's far from a simple task in an agricultural setting.

While local councils are increasingly providing more household recycling, it's neither a simple, easy or free process for farmers to dispose of their on-farm plastics in the most environmentally friendly and cost-effective manner. But one organisation is working to turn this around so that both the agricultural and horticultural industries can better manage plastic recycling post use.

Agriculture Plastic and Environment UK (or APE as it's better known) is a not-for-profit organisation which is focused on improving the awareness of, access to and ability to recycle. “We're supported and sponsored by the core plastics manufacturers, the three main agricultural distributors: Mole Valley, Wynnstay

Agriculture and Carr's Billington, as well as a few others,” says CEO, Ian Creasey.

Kuhn is the first manufacturer in the UK to sign up with APE, while as many as 14 others are in discussions to get involved. “If all of these manufacturers come on board it will cover more than 90% of the plastics used in UK agriculture. To their credit, they recognise that this is something they should be a part of.”

European standards

APE EU has existed in countries such as France for the past 18-20 years and Germany for the past decade, and so APE UK is following a model already established on the Continent, he explains. “Increasing agricultural plastic recycling in the UK is so important because Germany is recycling 70% of its agricultural plastics, France 75-80%, Scandinavia 80% and Ireland, where a legislative scheme is in place, manages above 95%. Whereas in the UK, despite past efforts to get this off the ground, levels are only at 25-30%.”

In its prior iteration in the UK, APE UK was established about four years ago with a view to collect a small levy from farmers at the point of purchase of plastics which supported the cost of recycling, but since then the organisation has been relaunched in its current format at LAMMA 2024. “We're now focused on effectively supporting the sustainable use and recycling of agricultural plastics by building on the current sustainable farming initiatives, through government support and good farming practices,” he explains.

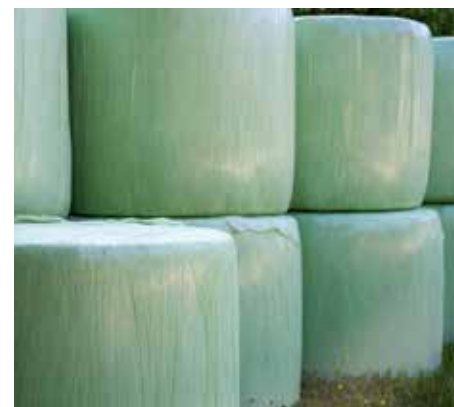
Over the next five years, the aim is to increase recycling in this country to 60-70%,

says Ian. “To do this we have to focus on building awareness of the problem and create a consensus across the industry, from retailers to farmers, and all the different organisations in between, such as regulatory and environmental bodies as well as plastic and chemical manufacturers.”

The other critical aspect of APE's role is to work with both central and devolved governments to articulate what has worked well in terms of recycling in other countries. “We're not necessarily looking to push for legislation, but we want to help direct government to build a structure that'll support the recycling of agricultural plastics and perhaps incentivise the process.”

So why does the UK have low levels of recycling and what can be done to make it more accessible for farmers?

The two key obstacles are the lack of available collectors in local areas, and the other is down to the cost, explains Ian.



Over the next five years, APE UK's aim is to help increase agricultural recycling in this country to 60-70%.

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First on board

Kuhn first came across APE at LAMMA earlier this year and immediately saw the benefits of partnership. "There's some trepidation that the government could impose a single use plastic tax, such as has been done in Ireland," says the firm's Rhodri Jenkins.

"Through Kuhn's technology, such as our 750mm stretch-film rolls that have a much higher pre-stretch ratio compared with wider conventional rolls, we can cut film costs by up to 37%. This has a value to the farmer at both ends of the chain as it is more cost-effective to buy and minimises the amount of plastic that ends up on farm and so there's less waste to dispose of," he explains.

Further to this, because the film is pre-stretched more than the market standard, it's actually

squeezing more air from the bale and therefore produces better quality silage, says Rhodri.

Kuhn has also introduced a new Silotite film, which is 1800m of sustained film that is made up of 25% post-consumer recycled film, to its demo machine this year. "This is Kuhn branded and is currently in limited supply but we're looking to expand it."

Another thing Kuhn will be doing is including stickers on all of its new combination balers that includes links to information on how to look after plastics. "We're looking at including a QR code on these stickers that will lead customers to our website and provide them with support, he says.

"Plastic is a dirty word in our industry, but if we can be seen to be more sustainable in the way we use it, then that's all for the good."



Plastic is a dirty word in this industry, but if it can be used more sustainably, then that's all for the good, says Rhodri Jenkins.

► "In certain areas, any of the Scottish isles being an extreme example, but even parts of Lincolnshire that are less accessible, there aren't nearby plastic collections. So the only way to remove plastic might be to arrange lorries to go around collecting it, and that adds pressure and cost.

"And the cost of recycling currently lands entirely on farmers' desks, and this can be up to £150-£200/t. Relatively

speaking, unless the farm is huge, it doesn't usually equate to a massive cost, but it's an inhibitor and naturally some will feel that it's not their job to pay for it."

If countries such as France and Germany are able to recycle such high quantities, how has this been achieved? "These countries have had their systems in place a lot longer than the UK, but the common theme is that there's government legislation in place. In

Ireland this takes the form of a levy added to the cost of every roll of film or bale wrap or sheeting, that goes towards the cost of recycling. In France and Germany the governments have supported recycling through means such as tax breaks.

These countries have also established successful 'bring centres' where farmers can take plastics on set days of the year, he says. "These are well publicised and help



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The cost of recycling agricultural plastics can be based on weight, so if there's a tonne of moisture and organic matter with the plastic, it'll cost a lot more.

to significantly reduce the cost to farmers as mass collection means the collector can work to the economies of scale when then taking the plastics to recycling centres. These are hosted in all sorts of locations including cattle markets, old quarries and on host farms.

"The key with all of this is that it makes it easier and cheaper for farmers, and it's created market support that has changed the game in Europe," says Ian. "So if we want this to work in the UK, we can't expect it to be achieved entirely off the backs of farmers."

Pilot schemes

Although bring centres already exist in the UK, these aren't of a significant magnitude to deal with the issues of accessibility and cost, he admits. "But with the support of government and the industry working collaboratively, we hope that it'll become easier to set these up and anticipate that a few pilot schemes may be run in the UK."

Although APE's remit isn't to



In countries which have established recycling systems there are successful 'bring centres' where farmers can take plastics on set days of the year.

facilitate the physical collection of or recycling of plastics, it's producing and distributing leaflets to provide information on how and where different plastics can be recycled locally, as well as best practice storage. "Just as with household waste, agricultural plastics should be separated into different sorts, for example plastic wrap and twine," explains Ian. "It should also be kept dry and free from as much organic matter as possible because this can all make a significant difference to its recyclability and the cost recycling it."

"The cost of recycling agricultural plastics can be based on weight, so if you have a tonne of moisture and organic matter for every tonne of plastic you actually want to recycle, this will cost you a lot more. But if plastics are stored well and separated then it becomes both easier and cheaper to recycle them."

As for what plastics can be recycled, Ian notes that most items are recyclable now, with storage and separation being the biggest inhibiting factors. "The rule with canisters is to triple rinse them and separate the can from the lid. The most difficult items to recycle are net wrap and twine because of their structure, but it's still possible, whereas just three years ago it was almost impossible. But the most prevalent plastic items are plastic bale wrap and silage sheeting."

Agricultural plastics play a vital role in regard to the sustainability of food, farming, animal and crop health, says Ian. "But to farm in a sustainable environment we must find a solution for them post use."

"If we don't do something about this by ourselves, it's still likely to find us one way or another. Whether that's from retailers pushing to improve their Scope 3 emissions or being forced to by government legislation, which APE doesn't necessarily favour as the preferable route." ■



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Separation solutions

Storage preparation

“It’s helping produce a really good, clean product which benefits both us and the wider supply chain.”

Investment in a new piece of kit has helped a Cambridgeshire farmer to make the most of intercropping. CPM finds out more.

By Charlotte Cunningham

As farmers seek sustainable weed control solutions, interest in intercropping has risen rapidly during recent years. Done well, not only can it reduce weed burdens, but subsequently it can increase yields and improve soil health and biodiversity – something which Cambridgeshire grower Hannah Darby has found.

Third generation farmer Hannah operates in partnership with her uncle, Tony, on the Sawtry Fens near Huntingdon. The arable land spans 300ha with 20ha of stewardship. In terms of the typical rotation, she says formulating a cropping plan has proven somewhat of a challenge during recent times, with oilseed rape not grown for the past 10 years and the final sugar beet harvest in 2023.

So now, it largely consists of winter wheat and intercrops, explains Hannah. “The intercropping is peas, beans and oats in various combinations, grown between wheat.”

Delving deeper into why she went into intercropping, Hannah says as well as the weed control advantages, the decision stemmed from struggling to keep pea crops upright. “They were going really flat – which was leading to problems at harvest – so I thought if we tried growing them with oats it might provide some scaffolding for them, which it did really nicely. Subsequently, we also achieved better weed control which together also meant better yield; it was a triple whammy.”

Increasing area

The move to intercropping started four years ago, with the area gradually increasing year-on-year from two tramlines back in 2021. Today, around 70ha of the arable land is down to intercropping with combinations of the peas, beans and oats varying annually.

However, Hannah says she hopes to expand this in the future, which she believes she’s now in a position to do after the purchase of a new piece of kit – a JK Machinery VibroMax Intercropper, a triple deck sieve cleaner from McArthur BDC.

“When we first started intercropping we had a mobile seed dresser, which was absolutely fine for solely dressing seed but not really designed for separating crops,” explains Hannah.

But with the crops being grown and harvested together, they had to be separated mechanically post-harvest in order to maximise the return, so she knew a better solution was required. “A typical

bean and oat mix may be approximately 20-30% peas and 70-80% oats, not forgetting various other admixtures that could be present and have to be removed.

“An oat miller may typically require a maximum of 6% screenings through a 2mm sieve and a maximum of 2% admixture. This means no more than 6% of the oats can be smaller than 2mm and no more than 2% of the bulk can be something other than oats.”

Beans for both feed and human consumption often require a maximum admixture of 2%. Therefore, not only did Hannah require something which could separate beans and oats, but



Hannah Darby says she hopes to expand her intercropping in the future, which she’s now in a position to do after the purchase of a new piece of kit – a JK Machinery VibroMax Intercropper, a triple deck sieve cleaner from McArthur BDC.

also something to remove admixture of both to achieve the typical admix and screening specifications.

With the challenge clear, Hannah ventured out to various agricultural shows to see what technology was on the market. "I was trying to pick a few brains as to what the options were and McArthur BDC were the ones who seemed to really understand the intricacies of separating mixed cropping."

After a discussion at Cereals in 2022, Hannah says the VibroMax Intercropper seemed to be a solution which would tick all of the boxes and so went to visit the McArthur BDC site at Scunthorpe to trial its separation capabilities with some of her pea and oat mixture from that year.

So how exactly does it work? Harvested crop is fed into the VibroMax Intercropper via an existing belt conveyor which was already on farm. The machine has both pre- and post-aspiration to remove light admixture and dust, but the real separation happens on the three sieve decks, explains John McArthur, managing director at McArthur BDC.

"The top sieve removes large admixture such as pods, thistle heads and stalk and this material leaves the machine via a side outlet. The middle sieve then separates the larger crop and this fraction leaves the machine via its own independent aspiration chamber. The bottom sieve separates the smaller clean crop which also leaves the machine via its own aspiration chamber. The fine admixture falls through the bottom sieve leaving the machine through an underside outlet."

Single pass

The benefit of the VibroMax Intercropper compared with other types of sieve cleaners is that you can separate each crop as well as remove its large and fine admixture in a single pass, adds John.



Hannah says as well as the weed control advantages, the decision to go into intercropping stemmed from struggling to keep pea crops upright.

"The independent aspirator chambers on the outlet means each can be fine-tuned specifically for the type of crop passing through it, ensuring the best results."

The Intercropper is paired with a JK Machinery Indented Cylinder which conducts a second finer separation of the smaller crop based on shape. "It's a likely occurrence in pulse and cereal mixes that some undersized or split pulses can pass through the second sieve with the cereals due to similarity in dimensions, however, the Indented Cylinder, sorting grains by shape, separates the round shaped pulses from the more pointed shape cereals," he explains.

Hannah's VibroMax Intercropper arrived on farm in early 2024. "We've made it a static system in one of our sheds so that we have the space and capacity to be able to expand it in the future if we wanted to."

While the separation abilities have been as good as she'd have hoped, something else Hannah has found interesting is the amount of weed seed in the crop which the machine has now revealed.

"Right at the bottom of the machine it pools any weed seed, and we've actually been quite amazed at how much has been coming off – you don't really ever

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The machine has both pre- and post-aspiration to remove light admixture and dust, but the real separation happens on the three sieve decks.



The Intercropper is paired with a JK Machinery Indented Cylinder which conducts a second finer separation of the smaller crop based on shape.

► realise what's being chucked out of the back. By capturing it, we're able to destroy it – rather than it going back onto the field – which will also add to our overall improved weed control picture.”

Although it's too early to comment on the return on her investment, so far Hannah says it's helping her to produce a really good, clean product which benefits both her and the wider supply chain.

Looking to the future, Hannah will continue to experiment with intercropping mixtures – with every break crop between wheat planned to be either an intercrop or a companion crop.

She's also looking to potentially offer cleaning and separating as a service to neighbouring farmers to help drive their confidence to try intercropping. “The VibroMax Intercropper has

been a really beneficial investment for us and will be integral as we move forward with our intercropping.

“It's really important to work with a supplier, like McArthur BDC, who can provide end-to-end support, understands what you're trying to achieve, and has knowledge and expertise around separating and cleaning crops,” she concludes. ■

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Gordons story



talkingtaties

by Andrew Wilson

The challenges continue

As seasons go, spring 2024 must be one of the most frustrating that I've experienced in 30 years of farming. It's tested everything – from kit, to people, to resolve, and everything in between. But we've made it, somehow!

To say sowing has been protracted is an understatement – field state has dictated planting order more than anything and having several drills has certainly paid off. We sowed the spring beans in the third week of April, which in all honesty, currently look superb.

Spring barley, however, is a different story. We strip-tilled the first Laureate into a levelled potato field on 17 April and placed some fertiliser under it – this looks excellent. The rest is a mixed bag varying from okay to 'why did we bother'. Some of it replaced second wheat on heavy land and was scratched with a spring tine and sown on 9 May, which is two months later than our standard average drilling date.

The first drilled of our spring oats also followed potatoes in late April, with the last almost direct drilled on 13 May – the latest ever by quite

a margin. I've taken the view that prices are heading in the right direction and if these moderate spring cereals pay the rent and leave us a bit of much-needed straw, then that's as much as we can expect.

Root crops haven't been a walk in the park but finally they're planted. We managed to sow the pollinator strips in the sugar beet fields in between drilling barley, and finally established the beet by 10 May, all of it with some encouragement placed under the seed. It's seemingly leapt out of the ground and is currently looking promising.

Speaking of beet, I managed to attend the BBRO's BeetField event held not too far away at Selby recently, the furthest north it's ever been by nearly a hundred miles. I urge all beet growers to attend these events; the knowledge transfer possibilities are endless and there's always something to learn.

We're generally quite relaxed about potato planting here. Historically our best performing crops are planted in May and emerge in a fortnight, so a late start didn't seem a big drama a month ago... then more rain happened!

We had 18 days of action and 12 of no planting to get 60ha of potatoes in this year. But, with a lot of frustration with silly breakdowns and a member of staff leaving us due to a change in personal circumstances (we have a vacancy if anyone is looking for a job with plenty of variety?).

At the time of writing, I have around half of our

pre-emergence herbicides applied and although the diff lock had plenty of exercise applying them, at least there's no shortage of moisture to activate them.

From a more positive perspective, we managed to harvest the last of 2023's potatoes on 4 May and chitting seed looks once again to be worthwhile, with a full two weeks' less time required from planting to emergence. This will make a significant difference to crop maturity and our harvesting schedule given the indeterminate varieties involved.

On the machinery front, we've also had a glimpse of the future when we hosted a demo of a robotic tractor. I'm sure they have a place in UK agriculture in specific circumstances, but the effect of urbanisation will make it nearly impossible for them to replace the average harvest student.

Exercising regenerative farming measures in a challenging season isn't easy, but we seem to be making progress. Bed tilling sits once again at about a quarter of the area, which is less than I expected. We're seeing the fruits of 13 years of cover cropping and strategic variety positioning, and for the first time in as long as I can remember, we've not used any nematicides at all this season.

These two items strike me as the most significant to reduce, from an energy, EiQ and soil sympathy point of view. I look forward to visiting some trial sites over the summer to pick up a few more tips for the future.

Our winter cereals are

Andrew Wilson is a fourth-generation tenant of the Castle Howard Estate in North Yorkshire. He has a strategic approach to direct drilling on his varied soil types and grows a wide variety of crops. He's passionate about the potato industry and having been utilising cover crops to reduce cultivation and chemical use since 2011, dipped his toe in the water of regenerative potatoes in 2021.

@SpudSlingsby

a mixed bag varying from 'four tonne potential' to a blackgrass infested patchwork of mediocrity, but are romping through growth stages quickly. Add to that prices which are heading in the right direction and fertiliser at least starting the season under a £1/kg of N, it's not all bad.

Harvest is apparently only a few weeks away but the combine is serviced, the baler has had some exercise with some hay, and the trailers are in a thousand pieces in the workshop, getting ready for hauling what will be an interesting harvest, I am sure.



I was able to spend some hours at an AHDB monitor farm meeting recently, listening and learning from the wisdom of David Purdy.

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Winning the war on volunteers

Potato agronomy

The potato industry and those that rent out land to grow the crop have to take a robust, joined up approach to reduce numbers of volunteers, which cause a long list of agronomic problems across crop rotations. CPM investigates.

By Rob Jones

Volunteers are a threat to the sustainability of potato production and agronomists are advocating an integrated approach to hit the problem hard and ease the rotation-round war of attrition.

Large numbers of tubers can be left in a potato field after harvest – one UK study suggests a figure of 370,500 per hectare – and up to 10% remain viable after a mild winter. In the case of last autumn's difficult potato harvest, the wet, mild winter that followed will have exacerbated the problem for many growers.

Potato volunteers pose a significant threat to potato crop health, principally because they can be a source of inoculum for disease including late blight, rhizoctonia, black dot, powdery scab, and silver scurf, as well as aphid-transmitted and spraing viruses and pests such as potato cyst nematode (PCN).

They're almost certainly behind the perpetuation of certain late blight strains,

says Frontier crop production specialist Reuben Morris.

While the potato sector is braced for the arrival of new blight strains EU_43_A1 (EU43) and related strain EU_46_A1 (EU46) in GB crops this season, established strains continue to pose a hidden threat of tuber blight infections, often not seen until crops are in store.

Reuben highlights strains such as EU_37, which is resistant to fluazinam, and 6_A1 (Pink 6), both of which appear able to cause tuber blight infections in the absence of foliar blight symptoms. The presence of groundkeepers on land used in potato production will allow these blight strains to persist, he says.

Disease pressure

Furthermore, volunteer potatoes can also exacerbate the threat from fungal disease silver scurf (*Helminthosporium solani*). "Silver scurf can be a real problem for growers who are trying to grow pre-pack crops. It's not an easy disease to control and keeping volunteers out will be of significant benefit."

Scottish Agronomy senior agronomist, Eric Anderson, is acutely aware of the threat potato volunteers pose to sustainable potato production, not only in terms of disease carryover, but also their ability to multiply virus and PCN.

"We have integration of seed and ware across Scotland and the legacy effect of volunteer potatoes and the virus levels they carry is an important issue for growers. Volunteers also amplify PCN in a rotation unless they're controlled," says Eric.

Control of potato volunteers requires a broad, integrated crop management approach, taking in rotation, appropriate harvester settings, cultivations and ag-chem solutions.

“Ultimately, the landowner is – or should be – responsible for controlling potato volunteers.”

Eric notes that treatment with maleic hydrazide will render between 70 and 90% of treated tubers unviable. "There's no doubt that with the challenges of late blight, virus and PCN, maleic hydrazide supports an integrated crop management approach within the rotation," he says.

Where it can be used – in second earlies and maincrop, and depending on customer protocols – liquid formulation maleic hydrazide (as in Crown MH), has also become the cornerstone of sprout suppression in stored potatoes.

Growers can dramatically reduce volunteer survival with a well-timed application of the product, says Certis Belchim global crop manager for potatoes and beets, Ed Bingham.

Much has been learned in the Netherlands about the product's potential to pitch the battle against volunteers in the potato crop itself rather than being dragged into a rotation-round war of attrition he says.

Recent trials at Certis Belchim's Londerzeel site in Belgium with varieties Milva (relatively indeterminate), Innovator (very determinate) and Fontane (intermediate) tested the efficacy of Crown MH in reducing potato volunteers in the following season.

"We found that in the Milva, we achieved 100% control of volunteers, about 95% control in Fontane and even in the senescing Innovator, we were still seeing 85% control, even in a challenging season for Crown MH application," says Ed.

Herbicide options for potato volunteer control within the rotation are dwindling but still include fluroxypyr, sulphonylurea group actives and clopyralid, depending on crop, but achieving good control can be difficult.

"In sugar beet, Conviso One burns off volunteers quite nicely but you'd also require some clopyralid to stop any regrowth," says



Volunteer potatoes are almost certainly behind the perpetuation of certain late blight strains, says Reuben Morris.



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Potato agronomy



Ed Bingham says growers can dramatically reduce volunteer survival with a well-timed application of maleic hydrazide.

► Reuben. "There's a difference between burning off the haulm of volunteers and getting herbicides down into the daughter tuber to stop them coming up."

An application of Debut (triflurosulfuron-methyl) tank mixed with Efekt (ethofumesate) will knock back potato volunteer haulm but again won't control tubers without the addition of clopyralid, he adds.

According to Eric, glyphosate pre-harvest in a cereal crop where appropriate, or on stubbles, can also provide useful control of volunteer potatoes, but care with rates is required and, in seed-producing regions, extreme care where there are seed potatoes in the area.

"A whiff of glyphosate will have a

devastating effect on a potato seed crop. You can, however, apply three or four litres of glyphosate to potato volunteers in stubble or pre-harvest and you're only going to get control of a proportion of those volunteers."

Non-chemical approaches to control should also be part of any integrated approach, he maintains. "Many potato harvesters will have picking tables and the pickers on the back of the harvester will be discarding tubers which are viable.

"Very few harvesters are equipped with chat crushers, which is a mechanical intervention that could be done and should be done, but isn't because there is a cost implication. It's an additional piece of equipment that could be factory-fitted- or retro-fitted, but it's just not being adopted."

Shallow cultivations can also contribute to groundkeeper control, particularly if there's a helping hand from cold weather, although climate change means there are fewer frosts penetrating the ground to kill off potato volunteers.

"If you plough you're burying the tubers 10-12 inches below the soil where they're protected from frosts with a blanket of soil, but if you're min-till you're keeping tubers close to the soil surface and they're more likely to get frosted," says Eric.

While there are undoubted benefits

across the rotation from control of potato volunteers, the question of who should have responsibility for doing it is a contentious one. "Ultimately, the landowner is – or should be – responsible for controlling potato volunteers," suggests Eric.

"In Holland, there's a limit to the number of volunteers that are permitted in a field in a rotational context and growers will be fined if numbers exceed that level. But in the UK, there's no control of that whatsoever.

"The challenge is that 80% of fields growing potatoes are rented. Therefore, landowner engagement on this issue is really important, as is their appreciation



According to Eric Anderson, there should be a restrictive paragraph in land letting agreements which states that control of potato volunteers is part of that agreement.

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Artificial intelligence

Looking to the horizon, new digital technologies could provide additional tools for groundkeeper control.

In Scotland, a work package led by Jim Wilson and his SoilEssentials team within the five-year PCN Action Scotland project, is developing machine vision and artificial intelligence (AI) technology to accurately identify, target and control groundkeepers within fields.

With the project due for completion in 2025, work underway includes integration of the SoilEssentials KORE precision farming portal with drone imaging to generate whole field maps, which will quantify and pinpoint groundkeeper locations. This will allow zone spray applications to be used to control groundkeepers in a range of crops.

Most recently, the focus has shifted to developing Soil Essential's SKAi retrainable spot spraying system for real-time detection, identification and control of groundkeepers on a farm sprayer.

"We've had SKAi systems working across Scotland and the UK and Europe spot spraying a range of weeds. The initial targets were docks in grassland and we've moved onto potato volunteers in onions, broccoli and sugar beet during the last couple of years," says Jim.

"The aim this season is to get a commercial agricultural contractor fitted out with a sprayer and out spot spraying groundkeepers in broccoli crops in Scotland."

Elsewhere, Certis Belchim has recently announced a collaboration with Irish company MagrowTec, which uses magnetic assist technology to enhance plant protection product performance, which going forward could be developed for use with Crown MH, says the firm's Ed Bingham.

While there's no quick fix for potato volunteer control, maleic hydrazide continues to be an essential tool in integrated approaches to potato crop management, he concludes.

of the importance of volunteer control for an integrated approach and building sustainable potato crop management."

However, given the nature of the land rental system in place in the UK, recognition of this might not always be as it should be, he suggests. "In my view, there should be a restrictive paragraph in land letting agreements which states that control of potato volunteers is part of that agreement, so the land is let to the potato grower and they're then responsible for controlling the

legacy effects of growing that crop."

Some might argue there's a case for regulation of volunteer potatoes similar to that already in place for PCN, for example.

"To grow seed potatoes in Scotland you require a certificate and freedom from PCN at the level of detection in a soil sample. But there's no legislation in place in terms of potato volunteers.

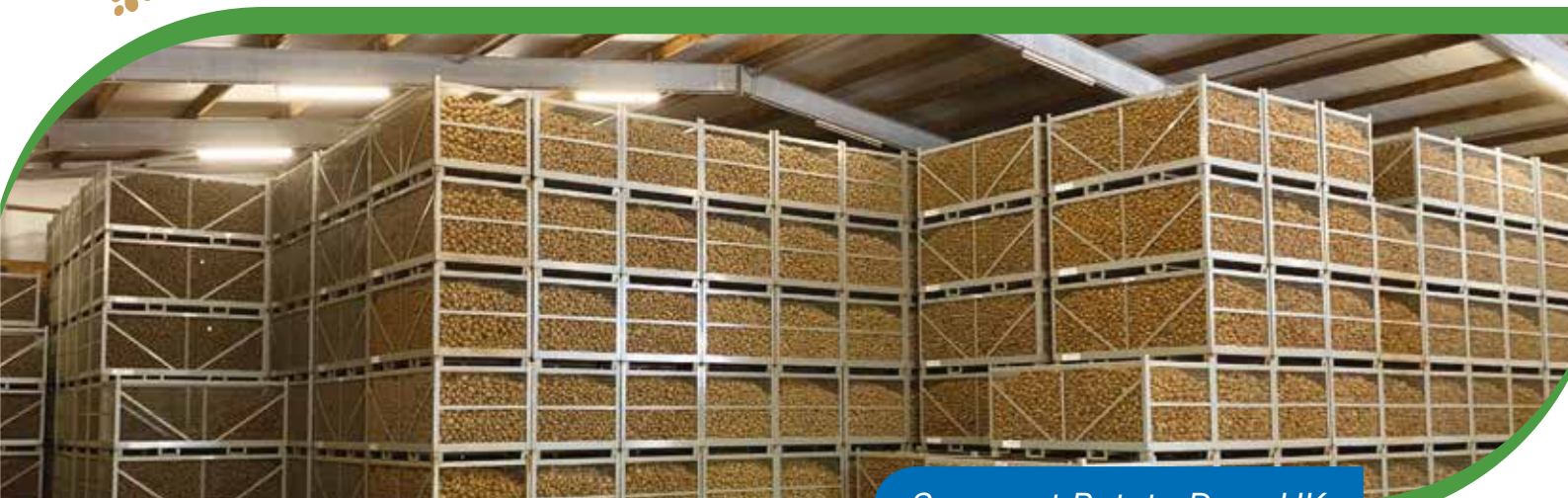
"So although you require a six-year or eight-year rotation for seed and freedom from any PCN being found, there's no legislation

which actually guides the grower or the landlord towards controlling potato volunteers – it's absolutely crazy," proclaims Eric.

He adds that in Scotland, discussions are taking place with growers, agronomists and the Scottish Government with regard to potato volunteers in the context of soil health. "What does 'soil health' mean? If you take it in a broader context, soil health should include freedom from, or at least a low level of, injurious pathogens such as PCN and possibly potato volunteers," he concludes. ■



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“If you’re going to invest in the system, it’s important to accept the management that comes with it.”

Sugar beet survey

Smart sugar beet

With the development of the Conviso Smart system offering a lifeline to sugar beet growers struggling to grow the break crop, *CPM* explores how it can be best deployed on farm.

By Charlotte Cunningham

Although sugar beet growers have been rocked by turbulent times of late, it’s a crop that’s looking likely to remain in rotations for the foreseeable future.

This is according to the results of a recent survey carried out by *CPM* and Limagrain, whereby 74% of growers revealed that they’ll continue to grow the crop – and not decrease its total area on farm.

“Sugar beet is still a very valuable crop for those who have it in the rotation,” says Bayer’s Roger Bradbury. “It’s a spring crop and brings diversity to the rotation giving growers an opportunity to try and manage problem weed populations in the autumn before the crop is planted.”

Among those growers continuing to realise the value of sugar beet is Yorkshire farmer, Andrew Wilson. Farming 160ha near York, sugar beet accounts for around 20ha of the crop area. “I don’t remember a time when we didn’t grow sugar beet,” he laughs.

While confidence in the crop may remain, there’s no doubt a struggle when it comes to plant protection products – with a decline in active ingredients registered for use in sugar beet during recent years.

However, on the weed control front, there

is an innovative solution in the Conviso Smart system which can help growers better manage their weed burdens. The system brings together the latest developments in breeding and chemistry and is based on two complementary components – an herbicide-tolerate variety which is then treated with a specific herbicide product.

While more than 50% of growers have either grown or currently grow Conviso Smart varieties – with 18% of these growers saying the varieties account for 76-100% of the total beet area – 18% revealed they’re not aware of the system. So how exactly does it work?

“The variety is a modern sugar beet hybrid type which carries a trait that confers tolerance to a dedicated ALS herbicide – Conviso One (foramsulfuron+ thien carbazole-methyl),” explains Roger. “The Conviso Smart system is those two components together – you can’t have one without the other.”

The benefits are varied, although most growers (59%) said their primary reason for utilising the Conviso Smart system was for control of weed beet, while 45% said it was due to the simplicity of the spray programme and a further 39% noting the broad spectrum of weeds the system is able to help control. “Smart beet has basically solved the problem with weed beet – it’s been very strategically useful,” says Andrew.

Limagrain’s Ron Granger picks up the conversation and says while there’s been a drive for several years to increase sugar beet area, this was limited due to the ongoing challenges with weed beet. “However, having the Conviso system in place has given growers the option to return to the crop.”

But the benefits go beyond just weed beet, says Roger. “The ALS components of Conviso One deliver effective, broad spectrum weed control, with the

foramsulfuron driving the grassweed efficacy and the thien carbazole-methyl component driving broadleaf weed control and providing an element of residual activity.

“In order to use the technology to best effect and preserve effectiveness of the system for the future, it’s really important for the farmer and agronomist to work together to understand the weed spectrum resistance profile of populations at field level and deploy the technology appropriately and accordingly.

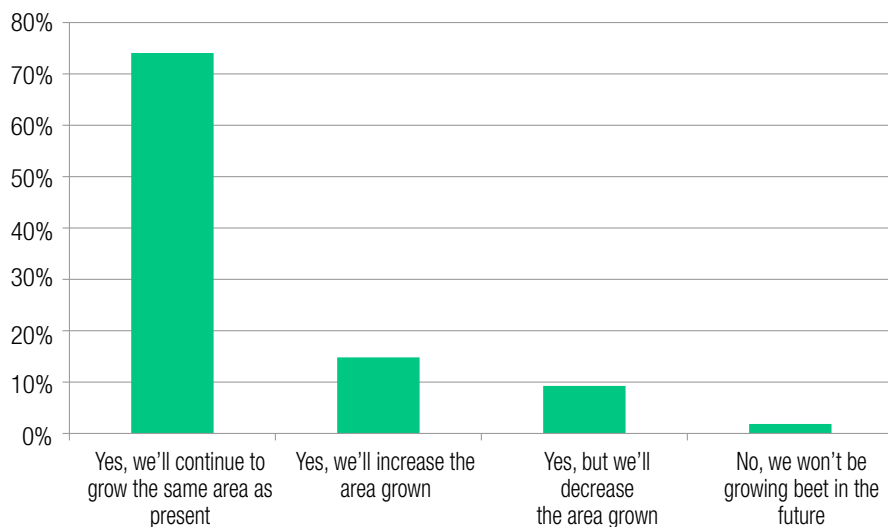
“Where they have the system, it also gives growers the potential to use fewer herbicides. But its one Achilles heel is common field speedwell, but again, if you understand the burden in your field, you can account for this and perhaps use selective chemistry in sequence to manage it while taking advantage of Conviso One for a range of other weeds.”

But it’s important to manage expectations, he warns. “Particularly with growers who haven’t used the system before, I think there’s a feeling that it’s possible to control really large weeds with it. It’s important

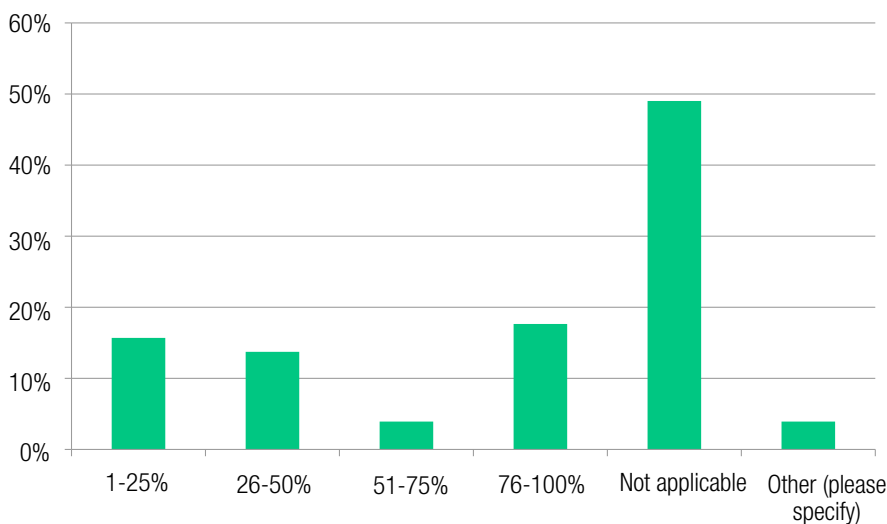


Ever since Conviso Smart was introduced the desirable agronomic characteristics have become better with yields increasing, says Ron Granger.

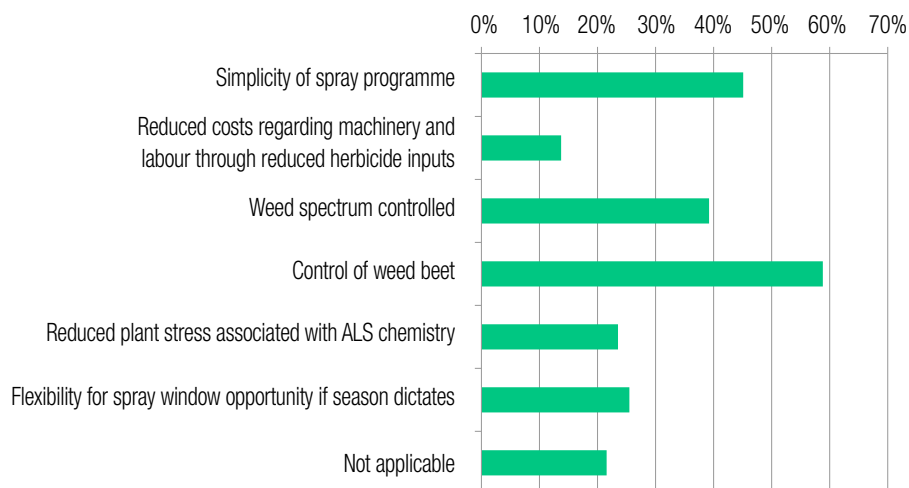
Will you continue to grow sugar beet on your farm in the future and if so, how do you envisage its future?



If you're growing Conviso Smart varieties, what percentage of the total beet area does this account for?



Why have/will you adopt the Conviso Smart system on your farm?



Smart beet has basically solved the problem with weed beet, believes Andrew Wilson.

to understand not all species are equally susceptible, so from an efficacy and resistance management perspective most reliable performance comes from treating weeds when they are small.

“So, it’ll control some species at a larger growth stage, but for others it’s more effective when the weeds are smaller. Groundsel is a good example – people say it doesn’t control it very well. But actually, it’s one of those weeds which grows very quickly and once they’re bigger and more established, the control is more variable.”

In terms of the approach to the herbicide aspect of the system, most growers (43%) said they prefer using Conviso chemistry with a post-emergence spray, while 22% said they use the chemistry alone. But is there a ‘best’ approach?

“It’s perceived as a one-hit product, and in certain conditions / seasons it does work as one,” says Ron. “However, when we have these seasons of warm, wet conditions we get additional flushes of weeds. In these situations, it’s worth considering other pre- and post- emergence herbicide programmes with differing modes of action. This will depend on the season, but the beauty is that Conviso One is flexible in terms of where you use it.”

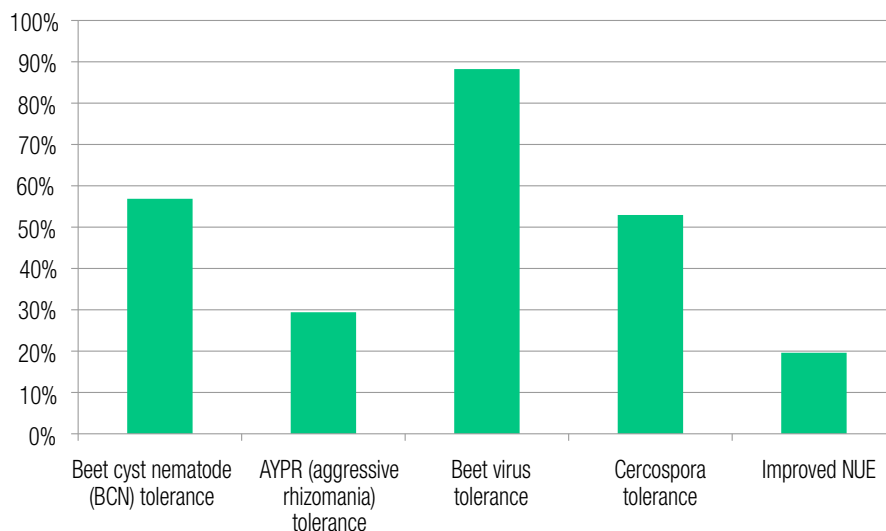
Andrew makes the most of this flexibility and uses it alongside post-emergence sprays. “This is partly because we sow nurse barley alongside the beet as part of our IPM strategy for aphid control.”

To protect the chemistry, Roger says general resistance management principles should be applied to the system too.

“This means treating weeds when they’re small and incorporating different cultural methods as part of the management of the weed profile throughout the rotation.”

As with anything, for all its pros there are some cons, with 43% of growers

As breeders develop new Conviso Smart varieties, what additional genetic traits would be of most value?



▶ stating that yield capability is a restriction of the system, while 35% made reference to the associated cost compared with traditional seed and chemistry. The yield lag within these varieties has been a key reason for Andrew dropping his Conviso area during recent years. However, breeders argue this is set to change.

“Yes, there’s a higher cost associated, but unless they use the Conviso Smart system, some growers can’t grow sugar beet because of how severe the weed beet issue is and on top of this we do see additional advantages from the system,” believes Ron. “Ever since the genetics were introduced the varieties coming through and added to the Recommended List have shown both higher yield potential and better agronomic security.”

Something he points out is that when the Conviso Smart varieties go through the Recommended List trials, they’re sprayed with a conventional chemistry programme – not the Conviso One they’re designed



Sugar beet is a very valuable crop for those who still have it in the rotation, says Roger Bradbury.

to be used with – which Ron believes impacts the official yield figures. “When we accumulate the data from both internal and independent trials, we’re looking at up to a 5% uplift in yield compared with the RL data on our Conviso One Smart varieties.”

Looking to the future, as breeders develop new Conviso Smart varieties, having beet virus tolerance was deemed the most valuable potential trait by the majority (88%) of growers, followed by beet cyst nematode tolerance (57%) and cercospora tolerance (53%). So is this likely in the future?

“Betaseed is a European breeding programme which tends to be more progressive when it comes to targeting new traits,” says Ron. “We know from our breeders that they’re currently trying to stack additional resistance genes. BCN is a key one – I think everyone in the industry is realising that – but beet virus and cercospora are key targets we’re particularly focusing on.”

“Regarding beet virus tolerance/resistance it’s important to point out that with the introduction of neonics, targeted breeding was reduced, but we’re now looking at the genetics again and essentially going back to basics. The hope is that growers should start seeing better traits over what we have presently coming through in varieties within the next three years.”

In terms of what’s on offer now regarding Conviso One varieties, Ron says Limagrain’s BTS Smart 9485 remains ever popular. “BTS Smart 9485 boasts one of the best all-round packages in this sugar beet category, offering high yield potential in combination with improved disease and bolting resistance.”

Delving into the figures in more detail, the variety has a treated yield (adjusted tonnes) of 93.1% with very good bolting tolerance

figures of 3055 ESB and 19 NSB. “This is on top of a good disease resistance profile offering 6.1 for rust, 6.7 for powdery mildew and (5.9) for cercospora,” notes Ron.

The longevity of the system will all depend on how well it’s applied on farm, and as such, there are careful stewardship guidelines which must be adhered to, continues Ron. This is despite 29% of growers saying they only have limited information on the guidance. “This is something we as an industry have to be very strict on – we can’t afford to break the chemistry,” he says.

Looking closer at this, Roger recommends actions such as clearly labelling Conviso Smart beet fields. “It’s also simple things like cleaning the drill thoroughly before and after drilling and considering spraying Conviso Smart beet after the conventional herbicides where possible. Tank rinsing and sprayer hygiene is obviously really important too. Having good communication on farm between everyone involved with the crop, including contractors, is vital to minimise the risk of spray errors. Conventional varieties are very sensitive to Conviso One herbicide so spray drift or residues from failing to rinse the spray tank thoroughly or worse still spraying a non-Conviso Smart variety will kill the crop.”

“Have a plan and policy around bolter management too in order to ensure everyone is scrupulous to avoid a new problem coming into farm. Pay close attention to the label advice – it’s a single application of 1.0 l/ha, not a split dose approach.

“It’s a great system, but not one that’s going to suit everyone and the attention to detail is critical. If you’re going to invest in the system, it’s important to accept the management that comes with it. Failure to do so could be damaging for both the crop and the future of the chemistry.” ■

Winner announcement

Congratulations to prize winner Tony Pulham from Suffolk who responded to the CPM/Limagrain survey and provided insight on sugar beet and the Conviso Smart system. Tony won a Sencrop weather station worth £1800.

He answered the tie-breaker question of: ‘The most important attribute when choosing a Conviso sugar beet variety is...’ with: ‘Flexibility, less workload, better chemistry and yield.’

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