

SUMMER 2021

ARABLE FOCUS

THE JOURNAL FOR THE POTATOES, CEREALS & OILSEEDS INDUSTRY

**Varietal resistance in
late blight control**

**The comings and goings
at Strategic Cereal Farms**

TOP OF THE CROPS

A look at the performance of benchmarked crops
over the last four years



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Welcome

View from the chair

When a levy payer describes the weather as catastrophically changing, you sense a dramatic shift in sentiment; the feeling that it will come right seems to have gone. Irrigating cereal crops in the UK is not normal in most years. The fact that it has now been carried out in April on some farms, three years in succession, is alarming.



The global markets are certainly reflecting the uncertainty of production against the weather and the declining stocks-to-use ratio. As the markets become more volatile, we will see politics having a marked effect on both buying and selling.

We hope to be at Cereals to catch up with growers at the first big physical event for some time. It's a fantastic testament to everyone that our industry's vital work has continued throughout the pandemic, and this will be a great opportunity to catch up with growers from across the UK.

Lastly, the Secretary of State has announced that there will be a ballot by next spring for the Cereals & Oilseeds sector. The first step will be establishing a registered levy-paying base, so please keep an eye on correspondence as we want to enable your participation.

Paul Temple

AHDB Cereals & Oilseeds sector chair

Over the hedge

News from across AHDB

Driving a positive rethink of dairy

Consumers are rethinking their attitudes towards dairy and red meat because of our recent 'We Eat Balanced' marketing campaign. The £1.5 million campaign targeted dairy and meat 'waverers' to remind and reassure them of the role red meat and dairy plays in a balanced diet, as well as the sustainability of livestock production in Britain. The results showed that 13% fewer people intended to cut back on dairy, 9% more shoppers are reassured on dairy nutrition and 3% more people intended to buy dairy. For more information, please visit: ahdb.org.uk/WeEatBalanced

Feeding cereal grains to livestock

Cereals can provide ruminants with a rich source of energy in the form of starch that, when fed with care, can have a positive effect on animal performance. We have developed new pages on the AHDB website that consider a range of methods for harvesting, processing and storing cereal crops destined to be fed to beef cattle and sheep. For more information, please visit: ahdb.org.uk/knowledge-library/feeding-cereal-grains-to-livestock

Potatoes 'New Packed Lunch' hits two million video views

At the time of writing, the AHDB Potatoes 'New Packed Lunch' campaign has reached two million video views across social media channels. The campaign has also seen jacket potatoes trending on Twitter with the **#JacketPotatoHacks**, **#AHDBPotatoes** and **#LovePotatoes** hashtags. Additionally, our collaboration with parenting community BritMums provided 19 million opportunities for people to see, share and engage with our potato content, helping to spread positive messages to carefully selected groups of shoppers. For more information, please visit: ahdb.org.uk/the-new-packed-lunch

AHDB launches wholegrains campaign

AHDB has launched a consumer marketing campaign based around a striking piece of art made entirely from wholegrains. The 'Beige is Beautiful' campaign is aimed at turning a popular cultural belief on its head by highlighting how so-called 'beige' food can be beautiful, both inside and out. It is also seeking to raise awareness of the importance of including wholegrains in a healthy, balanced diet. For more information, please visit: ahdb.org.uk/beigeisbeautiful

KPIs enable pig producers to make smart business decisions

Measuring success and failure is an essential ingredient for a bright future and key performance indicators (KPIs) can play a key role in the success of pork businesses. KPIs in the pork sector include cost of production, productivity – sow performance (pigs/sow/year), FCR and survivability and can both enable smart business decisions and monitor the effectiveness of pork production. For more information, please visit: ahdb.org.uk/knowledge-library/pork-kpis

New-look Pest Bulletin launched

AHDB has revamped the AHDB Pest Bulletin to give growers everything they need at a glance. The weekly update email, hosted by Syngenta, provides forecasts and up-to-date reports for most key horticultural field crop pests. The forecasts are designed to provide growers with the opportunity for early intervention to help inform pest-control decisions to protect crops. Data is collected from various locations around the UK, giving local and reliable information, as well as historical data to provide year-on-year comparisons of pest numbers. To sign up, please visit: ahdb.org.uk/keeping-in-touch

Potato sector chair **ON THE BALLOT VOTE**



We await the decision from UK Ministers on the future of AHDB Potatoes following the ballot. Like all of the team at AHDB Potatoes, I was very disappointed when I received the report from the independent scrutineer, UK Engage, which outlined that two-thirds of voters had backed putting an end to the statutory levy.

In the lead up to the vote, we engaged with a good proportion of the industry. Over 400 people attended our Town Hall events, AHDB Chair Nicholas Saphir and I attended meetings and spoke with many levy payers – while our potatoes team talked with hundreds more.

I encountered a huge range of views during my conversations with you, not just on the future of the levy but on the future of potatoes in Britain. I heard that while there are good and bad years of growing potatoes, the recent past has been unprecedented with challenges. I want to thank you all for your candour and your ongoing commitment to the industry.

The voting information shows that a clear majority of potato levy payers feel they are not getting enough value from the current set-up. This is a view we have heard and respect. AHDB is undergoing radical change, and you will hear more about that soon.

I would like to publicly thank the AHDB Potatoes staff for their work on behalf of the industry. I have been very impressed with the quality of delivery and level of expertise they have demonstrated during my time on the Potatoes Board. While I do not dispute that there have been missteps from AHDB that have contributed to this result, I believe our team can hold their heads high knowing they have delivered some great work for the industry.

It is now down to Ministers to weigh up all the various factors about the GB potato industry and decide on the future of a statutory potato levy. While Environment Secretary George Eustice has said that Parliament will revisit the legislation to remove the levies on Horticulture and Potatoes, confirmation of the official ministerial decision is not expected until the summer.

AHDB has been asked to collect a levy on potatoes for the 2021/22 season. We are legally bound to do this, and I would also mention that your levy number is an important part of the disease traceability system for potatoes in Britain.

The levy rates to be applied are being reviewed, and this will be completed prior to levy invoices being issued. However, it is important to say that the potato sector financial reserve levels are low. Therefore, to totally or partially wind up AHDB potatoes could require a levy rate similar to 2020/21 to cover all the costs.

2021/22 is not business as usual. At the time of writing, the Potato Board have recommended winding down all but critical matters, such as emergency crop protection work, and then focusing on delivering any ministerial decision.

We have created a frequently asked questions page on our website, which contains the information we know to date. Find it at ahdb.org.uk/potatoes-vote

With best wishes for the future,
Alison Levett





Does carbon dioxide have an impact on **potato fry colour?**

There is generally pressure for potato store managers to closely monitor carbon dioxide (CO₂) levels. However, this management tends to be met with mixed views. Here, Adrian Briddon, Senior Storage Research Scientist at Sutton Bridge Crop Storage Research (SBCSR), describes how experts are looking to settle the debate in an ongoing storage trial.



Tubers respire and, through this process, give off carbon dioxide (CO₂). This process continues in stores, where the gas accumulates in the store atmosphere. From the store, it can be lost through leakage or management (both automatic and manual flushing).

For processing crops, it is often recommended that CO₂ levels are maintained close to around 3,000 ppm to maintain optimum fry colour. While keeping below these levels was not much of an issue when CIPC was in use, the wider use of mint oil (Biox-M) has required significant changes in store management practices, notably, extended store closure following application. This has sparked concerns about the impact of CO₂ build-up on crop quality.

Mint oil and the store closure period

Following mint oil application, stores have to remain closed for at least 48 hours to ensure optimal absorption of the active in tubers. SBCSR has been investigating whether the resulting CO₂ build-up from extended store closure affects the fry quality of processing varieties.

Two store closure regimes are being compared. One with the store managed to not exceed 3,000 ppm carbon dioxide and sealed for 48 hours after mint oil application and the other managed to 10,000 ppm and sealed for 72 hours after application. After 35 weeks in stores, no significant differences in fry colour were observed between the two store management regimes, indicating that carbon dioxide was not important in determining fry colour.

However, it is crucial to consider why. In our work, ethylene remained absent. Remember, ethylene sources could be incompletely burnt fuel from petrol-driven foggers, contamination from an adjacent store using ethylene as a sprout suppressant or simply the exhaust of a gas or diesel-powered forklift truck being used in the store. Previous research has suggested that it is the interaction between CO₂ and ethylene that has a detrimental impact on fry colour.

Keep monitoring CO₂ and choose your fogger carefully

If fry colour is important for your customer, it is recommended to only use an electric or heat-exchange fogger to apply mint oil. This will ensure the absence of ethylene during extended store closure periods following application and minimise any impact on fry colour.

We are not suggesting carbon dioxide management should be relaxed when ethylene is being used as a sprout suppressant. In these systems, it is important to continue monitoring CO₂ levels on a regular basis.

Carbon dioxide can pose a risk to human health at certain concentrations, so it is vital to adhere to Health and Safety Executive recommendations, including relevant workplace exposure limits.

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Students' Union: Beetles bashed by biologicals

With pyrethroid power increasingly rendered ineffective by resistance, one AHDB-funded PhD student is working on biological solutions, writes Jason Pole, Marcomms Manager.



In horticultural crop production, especially in protected systems, biologicals increasingly provide a solid foundation for the control of an array of pests. The need to find viable alternatives to synthetic pesticides in arable crops has seen Harper Adams University PhD student Claire Hoarau turn to naturally occurring nematodes, bacteria, fungi and toxins in a quest to beat the beetle.

BIOLOGICAL BASICS

- A biopesticide (bioprotectant) is any biological crop-protection agent based on living microorganisms, botanicals or semiochemicals
- A biocontrol agent is any living organism used to control another (e.g. predators and nematodes)
- Biological approaches are attractive, as the best ones are not only effective but also have minimal environmental impact, high target-pest specificity and provide breadth to crop protection programmes

Nematode solutions

Claire's work investigated four nematode species, with the current front-runner *Heterorhabditis bacteriophora* (Hb). Hb has a proven track record. For example, it is already approved in the control of a major horticultural pest beetle – the black vine weevil. Her bioassays have assessed three nematode concentrations (4,000, 10,000 and 40,000 nematodes/ml), with each treatment targeted at ten adult CSFB. So far, the results are variable, especially at lower doses. However, the highest dose of Hb resulted in complete mortality in just two days.

Act cleaned up

For hundreds of years, soap has been used to keep insect populations in check. Such solutions work on direct contact with the pests. Often, it is the fatty-acid component that matters most. In some protected crops, a broad-spectrum contact biopesticide is authorised for UK use – marketed as FLIPPER. This fatty-acid-based product penetrates the pest target, disrupts metabolic processes and causes reduced feeding and death. In lab bioassays, Claire found that a field-rate-equivalent application (10 ml/l) resulted in 85%

beetle mortality just a day following application. Other physically acting products have also shown potential, although not as high as FLIPPER.

Toxic tactics

The soil-dwelling bacterium *Bacillus thuringiensis* (Bt) is commonly used as a biopesticide. Three formulations of *B. thuringiensis* subspecies *tenebrionis* (Btt) have been used in CSFB screens too. This saw beetles fed leaf material that had been dipped in a Btt solution. Unfortunately, this approach resulted in relatively low levels of beetle mortality.

Finishing in autumn 2022, there is still plenty left to do. One of the most exciting elements is taking the promising approaches identified in the controlled lab experiments and testing them under field conditions. This aspect will include assessments of the impact of these biologicals on non-target organisms, as well as economic assessments. It will also look at the potential of using biological approaches in combination with other control options.

For more details – including the other novel agents under test, such as entomopathogenic fungi – head to our research page, check the 'Cereals & Oilseeds' sector box and search for the keywords 'PhD' and 'CSFB'.

ahdb.org.uk/research

Industry partners: AgriFood Charities Partnership (AFCP) and Certis Europe.



CSFB control COLLABORATION

When a big issue arises, everyone wants a solution. An all-too-human response is for everyone to react in their own ways. Although better than nothing, it is often not an efficient route to an industry-wide answer. Jason Pole reveals how the UK has found itself at the heart of a coordinated attack on CSFB.

Last year, we revealed the factors most likely to influence cabbage stem flea beetle (CSFB) pressure in winter oilseed rape (OSR). The ADAS-led research identified 31 factors, including an estimate of the reliability of each effect and an indication of how open each factor is to management.

Of the CSFB pressure factors identified, 20 decreased it, seven increased it and four, on balance, resulted in a neutral outcome. The research team mapped out the key factors across a growing season and used a traffic-light system to indicate those most likely to affect control. Only two received a green light: trap crops and soil conditions during sowing/early establishment. The bottom line is that no non-chemical approach is completely reliable. A combination of tactics is needed to deliver the multiple hammer blows required to suppress CSFB.

Trap crops

Oilseed rape volunteers can act as trap crops and divert CSFB away from adjacent cash crops. In trials, the approach reduced adult infestation (by up to 88%) and damage (by up to 76%). It also resulted in higher plant populations (by up to 56%) and reduced larval populations (by up to 69%). However, benefits were variable and not always observed.

Soil conditions

Weather strongly influences CSFB life cycle and crop development. If the crop has yet to emerge or is emerging when CSFB arrives, it is highly likely to result in crop damage/death. Therefore, sowing dates and soil conditions – particularly soil moisture during emergence – are critical. However, the accurate prediction of risks remains elusive.

Defoliation

As CSFB larvae are far more likely to be present in leaf petioles than in the stem, managed defoliation also showed some promise. In trials, it reduced larval numbers significantly (by 23–55%), with late defoliation, before stem extension, most effective. Linked on-farm trials found that sheep grazing and topping reduced larval numbers by 51% and 25%, respectively.

However, researchers did not detect significant yield increases in crops with reduced larval populations. As the technique requires refinement, this approach was marked as ‘amber’.

Collaboration

To build on the solid leads from the research, we recommissioned ADAS to investigate beetle biology and associated crop damage further. Critically, collaboration is hardwired into this three-year (2020–23) project. This element sees researcher-led on-farm trials test the power of multiple control options. It also taps into a new cross-industry task force that will share CSFB data across multiple initiatives – it has been dubbed CSFB ‘SMART’ – ‘Sharing Management and Agronomy Research Tools’.

THE CROSS-INDUSTRY TASK FORCE

Research partners: NIAB, ADAS, Harper Adams University and Rothamsted Research

Industry partners: United Oilseeds, Sentry Farming, alongside independent and distributor agronomy advisers and plant breeders

Funding partners: Defra and AHDB

The NIAB-led SMART project will also ramp up the number of on-farm trials by giving farmers full control. The three-year project (2021–24) will recruit and support growers to conduct and assess their own trials, as well as share their experiences across the network. By swapping notes, the whole industry will learn from the successes and the failures. The initiative also supports the continuation of national CSFB surveys, for a few more years at least.

The oilseed Yield Enhancement Network (YEN) has also risen to the CSFB collaboration challenge. Moving beyond the traditional yield focus – but retaining its competitive element – it now features an ‘establishment beauty contest’.



Last autumn, participants submitted data about establishment practices, plant populations and CSFB damage, as well as crop photos, with the winners of the three award categories announced at the AHDB/United Oilseeds seminar in February:

- Early-drilled OSR (until 14 August) – winner: Robert Fleming (Scottish Borders)
- Standard-drilled OSR (15–31 August) – winner: Stuart Russell (Lincolnshire)
- Late-drilled OSR (1 September onwards) – winner: Rob Fox (Warwickshire)

Once again, this effort will help establish what works and why it works. At its foundation is an AHDB-funded analysis of YEN data that interrogated 151 yields from across 92 farms (2017–19) to better understand the factors affecting yield. CSFB is a key reason why UK OSR production is currently at such a low ebb. By pooling efforts to tackle the pest, we will be in the strongest position to come up with the solutions required to sustain production.

Trial topics

On-farm investigations include:

- Straw mulches
- Stubble length
- Companion crops
- Organic amendments
- Trap crops
- Varietal tolerance
- Establishment approaches
- Crop nutrition
- Interaction trials

Follow the cabbage stem flea beetle story at: ahdb.org.uk/csfb

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Stepping forward into regenerative agriculture

With its potential to drive down production costs, improve margins and increase soil health, AHDB Knowledge Exchange Manager Teresa Meadows takes a close look at regenerative agriculture.



Last autumn, I attended (virtually) the annual Agri-TechE REAP conference. As usual, it was packed full of people and organisations innovating at the frontier of agriculture. However, I was particularly keen to hear the views of David R. Montgomery during his AHDB-sponsored presentation.

An author and professor of geomorphology at the University of Washington, David has travelled the world to hear how farmers have reversed the fortunes of their soils. Numerous conversations later, he now believes soil-health nirvana can be achieved through the adoption of three general principles of conservation agriculture:

1. No or minimal soil disturbance to help soil life flourish.
2. Growing ground cover to lock in nutrients and protect the land.
3. Using a diverse rotation (three or more crops) to promote life and avoid nutrient overextraction.

Can regenerative agriculture pay?

If a new approach is clearly more profitable, then it has hope. David found that to be the case, as did an article by Claire LaCanne and Jonathan Lundgren published in 2018*. The study described used system extremes to test the difference regenerative agriculture could make.

Corn production in the Northern Plains of the United States is dominated by large monocultures, which are heavily dependent on inputs and tillage. The study compared the 'conventional' fields with 'regenerative' cornfields, which included three or more compatible practices – such as planting a multispecies cover mix, eliminating pesticide use, abandoning tillage and integrating livestock. However, the conventional cornfields applied none, or only one, of the practices.

The average gross profits are shown in Figure 1. The analysis used direct costs and revenues for each field (across all 40 fields in each treatment) and excluded any overhead and indirect expenses.



Headline results

- Regenerative fields had 29% lower grain production but 78% higher profits than the conventional fields
- The profits were largely driven by input savings (fertiliser, pesticides and fuel)
- Profit was positively associated with the particulate organic matter of the soil, but not yield

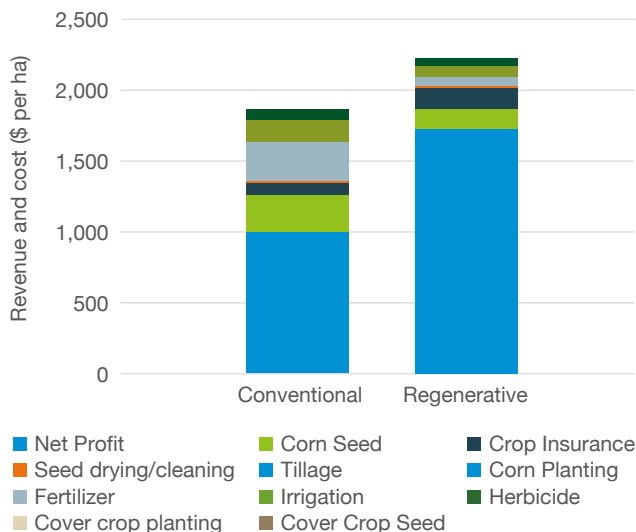


Figure 1. Revenue and costs for US corn production – ‘conventional’ v ‘regenerative’ system*

*LaCanne, C. E., Lundgren, J. G. (2018). Regenerative agriculture: merging farming and natural resource conservation profitably. Peer, J. 6:e4428 doi. org/10.7717/peerj.4428

What about regenerative agriculture in the UK?

As the general principles translate to any cropping situation, they could (in theory) be made to work anywhere. Obviously, UK cropping systems are different from US corn production. However, the fact it does pay in some situations means it deserves our attention.

Lessons from early adopters of regenerative agriculture show:

1. Yield depression is often seen in the first few years.
2. Those who use all three principles from the start tend to record successes more quickly.
3. Although the general principles translate to other settings, the specific practices need to be tailored to the specific setting.

With no blueprint available, the sharing of locally relevant experiences is essential – and this is where our Monitor Farm and Strategic Farm networks come in. For example, many of our farms look at cultivation approaches, cover crop species/mixtures and rotational design. Across AHDB, the organic and field vegetables sectors also provide a valuable reference source for arable farmers.

Will the technique flounder or flourish?

Regenerative agriculture comes at a time when the industry is more business-savvy, with greater attention paid to the details and the long-term effects associated with change. Future policy changes and the need to mitigate against climate change and improve our environmental credentials also mean that these kinds of techniques are likely to gain increased interest. Then, there is the consumer, who will continue to demand affordable, nutritious and sustainably produced food. Can markets be created that further support development of these techniques?

“It is certainly feasible that all farmers across the world could use all three principles of regenerative agriculture successfully by 2050. This era will become the new conventional agriculture, with the old approach potentially referred to as high-input Palaeo agriculture”

The approach, alongside integrated pest management (IPM), provides an opportunity for farmers. However, as David concluded: “There is no ‘easy button’, when it comes to implementing regenerative farming.” Those who use their independence, intelligence and ingenuity to learn from their own experiences and those of others are most likely to thrive. And David certainly believes that regenerative agriculture could win out.

David R. Montgomery, Professor of Geomorphology at the University of Washington

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INDUSTRY DONS prevent, detect and control IPM mantra

AHDB's IPM programme lead, Don Pendergrast, explores the recent shift in pace and how our new strategy will help level up the adoption of the approach across the UK.





As a crop scientist, it is clear that the industry has already adopted many of the principles of IPM. The challenge has always boiled down to assessing and increasing the level of adoption – how do you measure or encourage progress if you don't know where you started?

This is why it is great to see industry tackling this head on, which involves the introduction of a common language. IPM, like many concepts, is packed full of jargon. In more academic circles, this may be essential. However, when it comes to the practical application, it can get in the way.

Whether it be the in-press revision of the National Action Plan for the Sustainable Use of Pesticides, the NFU-VI IPM plan or the industry push to embed IPM under Defra's proposed Environmental Land Management (ELM) scheme, you will see the same terms used again and again – prevent, detect, control. With IPM redefined, it is timely to explore the meaning behind the words.

Prevent

Management of pests, weeds and diseases starts with the prevention or, at least, suppression of the problem. This is where crop rotation, site selection, varietal resistance, cultivation approach, hygiene/biosecurity measures come in. Here, one of the biggest challenges is to consider all of the potential risks and how each management approach affects them. There will always be trade-offs. A solution for one, may inflate another issue. Understanding these better is essential to balance management and get the most out of IPM.

Detect

Monitoring is critical. Relatively recently, a variety of smart tools have been developed to focus crop-walking efforts. Forecasting services are also increasing and, critically, becoming more reliable. But we must not lose sight of the fundamentals. It is reassuring that more people are taking the time to accurately identify the species present and to understand the early signs of issues. The more trained eyes on the ground, the better. At AHDB, we also invest in economic spray thresholds. These require constant review to keep up with the changing agricultural landscape, with constant shifts in pest populations, efficacy, varieties, inputs and economics.

Control

The use of pesticides must always be an option of last resort. When economically justified, it is important to use them in line with resistance management guidance – right product, right way, right place, and right time. The rise in resistance/tolerance to plant protection products is concerning. The whole industry needs to unite to recognise resistance threats early enough to tackle them. Resistance management advice also needs to evolve in response to changes in efficacy, the loss of actives and the arrival of new modes of action. The market for biological control is also expanding. We need to learn from other sectors, especially horticulture, and embrace lower-risk products, wherever economically possible.

Review

Time is our enemy. There is never enough of it. But a critical element of effective IPM is reviewing the success (or failure) of the crop protection measures you have undertaken. This review should be timely and it's good to do it in discussion with your adviser. Done regularly, it will help you make the right choice more often and consolidate on the gains you make from the use of effective measures.

Putting the 'I' in IPM

IPM is a knowledge-intensive process. It isn't simple, especially the integrated elements. With so much to think about, we have worked to repurpose our crop management guidance. An increasing amount of literature is now found directly on our web pages, rather than as downloadable PDFs. This makes information easier to find via search engines, but it also allows us to connect the IPM landscape together – pointing you to related content and helping you to integrate. At its heart is the IPM area of the website, where we highlight timely content as each season progresses.

We are also collaborating across the industry to ensure the IPM approach is developed collectively and woven into the fabric of UK farming. This includes promoting the work of NFU and Defra as part of efforts to support IPM actions under ELMs. We are also involved in a five-year EU Horizon 2020 project that has ambitious plan to get to grips with decision support systems (DSS) across Europe. You can find out more about this on pages 26–27. However, any (simple and affordable) tool that takes the guesswork out of farming is welcome.

For more information, please visit: ahdb.org.uk/ipm

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The value of varietal resistance for late **BLIGHT CONTROL**



With the loss of key plant protection products, varietal resistance to late blight is becoming more important for a successful integrated pest management (IPM) strategy, explains Anne Stone, Knowledge Transfer Manager – Potatoes.

Varietal resistance to late blight, including the newer strains which have become prevalent, can still make a real difference to control. Using varieties with good resistance to late blight is not only a good foundation for IPM but is also likely to help keep active ingredients more effective against the disease for longer.

Putting resistance to the test

In 2019, we put some of the most popular potato varieties, including Russet Burbank, Maris Piper and Markies, to the test. We wanted to chart how closely they performed to their resistance rating when under extreme blight pressure. The trials, held at Eurofins, demonstrated 12 varieties in two blocks; one treated with a strong fungicide programme, the other with a shorter and simpler spray programme.

We saw real differences when we reduced the fungicide programme to three applications of Dithane and three of Curzate. The trial really highlighted the importance of foliar resistance ratings.

When fungicide applications were reduced, Maris Piper, which has a foliar resistance rating of 4, showed 60% defoliation when assessed on 21 August. If you compare that with Markies, which has a higher resistance rating of 5, that variety showed just 15% foliar infection.

As these two varieties are commonly grown on the same farm, this knowledge could help you make decisions on which variety should take priority with limited spray programmes. Of course, there may be cases when this would need to be dictated by field and tank size.





The trials were also useful to confirm that varieties that have been around for a long time, such as Maris Piper, still have the appropriate resistance scores, in spite of changing blight genotypes.

One suggestion from the trials is to grow varieties with similar blight ratings in blocks, as this could help when designing spray programmes. When it is difficult to maintain spray timings, this system could help you decide which block to spray first.

Breeding for success

All new varieties undergo rigorous testing at SASA for resistance before they are approved for National Listing. Even varieties with partial resistance have great value.

Jack Vossen, Senior Scientist at Wageningen University, recently revealed that seven genes with broad-spectrum resistance to late blight have been identified. These will be really useful for breeding into potato varieties.

Six of these resistance (R) genes have already been used in current varieties, such as Sarpo Mira, Vitabella, Carolus, Avito, Alouette and Acoustic, and there are others in the pipeline. This may mean more durable late blight varietal resistance could be on the way.

Jack explained at a recent AHDB webinar that one of the challenges of late blight is its ability to reinvent itself and break down resistance. The speed of breakdown of varietal resistance is particularly concerning, as it can happen within one season.

“Inserting more than one gene capable of resisting late blight (stacking) means there is a back-up even if one resistance gene in the variety subsequently becomes vulnerable. In plants with R gene stacks, the chance for resistance breakdown within one season was drastically reduced,” explained Jack.

BlightSpy: New risk-forecasting service launches

Monitoring and forecasting for the risk of late blight infection is another important foundation of a good IPM strategy.

This year, we have launched an improved forecasting service to give you an earlier warning, to aid decision-making around spray timing and intervals.

Still based on the Hutton Criteria, BlightSpy will now provide a risk forecast eight days ahead, instead of the three-day outlook. A new integrated map will give you a full picture of the risk levels across the UK. Plus, you can review historic data to compare forecasts with actual data.

BlightSpy replaces Blightwatch and you can register for alerts here: ahdb.org.uk/blight-spy

To find out more about the varietal resistance trials and to watch the webinar, go to: ahdb.org.uk/news/varietal-resistance-to-late-blight

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Harvest 2021 – what might we expect?

With the current growing season so far wrought with far fewer challenges than 2019/20, Vikki Campbell, AHDB Senior Market Specialist Manager, looks at what can be expected from harvest 2021.





At the time of writing in April, there is still much of the growing season to come. However, we can now start to make more indicative forecasts as to what domestic grain production could be this year.

The season to date

Although unsettled, autumn planting conditions this year were much kinder than the weather-challenged 2019 season. Many growers opted to drill early, keen to avoid any establishment challenges that a turn in the weather could bring. While the wet October did cause some stop-start to drilling progress, most of the winter cereal area had been planted by the end of November. Perhaps unsurprisingly, the wheat area has recorded a large rebound, while the intended spring cropping area is back. Oilseed rape continues its area decline; the pressure of weather and pest damage over successive seasons proving a detractor for many.

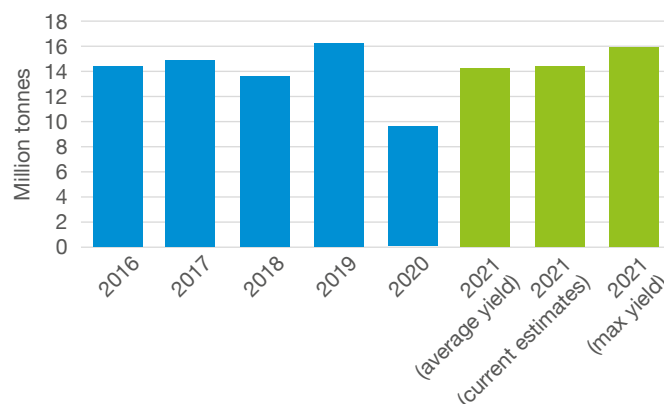
A wet January and February did put some pressure on spring drilling campaigns. However, by the end of March, an estimated 70% of the spring wheat area was sown, alongside 40% of the spring barley area. As winter crops emerged from dormancy, they were faring much better than the year before. For winter wheat, 63% was rated good–excellent, while for winter barley, 60% sat in these categories. This is a significant improvement on the year; in March 2020, only 43% of winter wheat fell in the good–excellent category, with the figure at 45% for winter barley.

What might cereals production be?

With an increase in winter cereals area and improved crop conditions on the year, what production volumes might be realistic? When area estimates are first published in December, the production range for the year would be calculated using the highest and lowest yields from the previous five seasons. However, now we know the condition of the crops as they enter the main growing period, this range can start to be narrowed down somewhat.

Given the notable improvement in crop conditions from the year before, we can estimate that, currently, yields could sit on, or slightly above, average. The strongest yield recorded in the last five years is 8.9 t/ha from 2018/19, which saw 93% of winter wheat and 95% of winter barley crops emerge from the winter in good–excellent condition. While conditions this season are better than last season, they are some way off these strong 2018/19 levels. As such, yields this season may not challenge 2018/19 highs.

If the five-year average yield is applied to the forecast area, the UK would be looking at a 14.1 Mt wheat crop. Given current conditions as at April, and industry feedback, we could expect yields this year to sit slightly north of the average and return a production figure in the region of 14.5 Mt.



UK wheat production comparison and projection

Source: Defra, The Andersons Centre, AHDB

Following the same logic for barley, we could see winter barley production between 2.7–2.8 Mt. When added to an estimated spring barley volume (using five-year average yields), this could see total UK barley production ranging between 7.0–7.1 Mt.

Moving into the next marketing season

While a rebound in wheat production will go some way towards fulfilling demand, supplies could still be tight next season. The tight production in 2020 and minimal carry-out stocks this season mean that imports will still be required to meet domestic requirements.

Barley inclusion in feed rations has been strong this season, due to its discount compared with wheat and greater availability. Despite this increased use in animal feed, a surplus of 1.5 Mt is currently estimated. While a smaller forecast production will obviously add less to stocks, exports will still need to be strong, especially if animal feed compounders switch back to increased wheat usage.

As we move forward through the 2020/21 growing season, we know we come into the calendar year with an increased winter cropping area than a year earlier and with crops faring better over the winter. However, it is important to remember that there is still time and opportunity ahead for crop conditions to change markedly with the key growing season ahead.

For more cereals and oilseeds market information, please visit: ahdb.org.uk/cereals-oilseeds-markets

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UK CEREALS EXPORTS

in a post-Brexit environment

With the UK now six months into the new Brexit trade deal, AHDB Assistant Exports Manager, Dorit Cohen, reviews the current situation regarding the barley and wheat exports markets.



As the new Brexit trade deal comes to the end of its first six months, UK traders are buoyed by continued access to key EU markets. Here, we look at how the UK has been faring with regards to barley and wheat exports.

Barley exports

Barley exports, especially to the EU, have been relatively strong. This is demonstrated by HMRC data which shows that during the pre-Brexit period, from July 2020 to the end of December 2020, barley shipments into the EU totalled around 771,400 tonnes, accounting for 79% of UK barley exports.

Portugal, a long-term recipient of both wheat and barley, has taken in around 140,000 tonnes of UK barley during the period July 2020 to February 2021, accounting for approximately 40% of its import requirement. The Republic of Ireland, another important EU customer of UK cereals, has imported approximately 154,000 tonnes of UK barley during the same period, accounting for over 50% of its import requirements.

Although the EU has been the main recipient of UK barley so far this season, UK barley exports continued to non-EU destinations. According to HMRC data, the North African countries of Algeria (115,000 tonnes), Morocco (60,000 tonnes), and Tunisia (27,500 tonnes), which have been severely impacted by drought, contributed to an increase in regional imports to just over 200,000 tonnes up until the end of February 2021. This was to meet domestic demand requirements for animal feed.

For the rest of this season, barley exports will be the largest source of grain out of the UK, the majority of which will be destined for EU markets. It will be crucial for our barley prices to remain competitive on global markets for the UK to export its large surplus this season.

Wheat exports

According to HMRC data, UK wheat shipments into the EU totalled just under 117,000 tonnes during the pre-Brexit period from July to December 2020. This accounted for around 80% of UK wheat exports during the same period, clearly demonstrating the importance of the EU Free Trade Agreement. However, total UK wheat exports this season have been modest, due to a low domestic wheat crop.

Following this season's low domestic crop, areas of the UK have now recovered, something which has been driven by higher-than-expected plantings and improved crop conditions as of the end of March. With these improved conditions, and indeed larger crop areas, GB wheat production in 2021 could therefore reach 14.6 Mt. However, although the UK is forecast to see a much better wheat crop than in 2020, with tight ending stocks, UK wheat exports are likely to be somewhat limited.

For more information, including monthly trade data, please visit: ahdb.org.uk/exports

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Seed potatoes firmly fixed under Brexit cloud



In light of the prohibition on export trade to the EU, Patrick Hughes, AHDB Head of Export Trade Development – Potatoes, reviews the current situation.

Following the Brexit trade deal, the EU Commission has indicated that prohibition on export trade remains in place as the UK Government did not commit to dynamic alignment with the relevant EU phytosanitary rules. This has effectively ceased the export of seed potatoes to the EU and Northern Ireland from 1 January 2021.

Consequently, a group of farming unions and federations representing French, Dutch, Spanish, Irish and British organisations, potato farmers and traders have collaborated to directly appeal to the EU Commission and the UK Government. They are hoping to succeed in agreeing on a new model for two-way trade in seed potatoes between the UK and the EU, where political dialogue has, so far, proved unsuccessful.

Great Britain (GB) exports 20% of its seed potatoes into the EU, with approximately 25,000 tonnes exported annually and a further 2,000 tonnes sold into Northern Ireland. In the run-up to the end of the transition period, most (if not all) seed exporters had been working with their EU based customers to ensure their 2021 orders were delivered in the last few weeks of 2020 to avoid a non-supply issue. SASA have indicated that 15,600 tonnes of seed potatoes, lower than the annual average, had been exported in the run-up to the 31 December deadline.

The volume of seed potatoes exported to non-EU countries remained at similar levels to 2020, with just over 80,000 tonnes being shipped. Egypt remains the largest export destination at

approximately 43,170 tonnes, followed by Morocco at 10,686 tonnes. Volumes of exports to Saudi Arabia and Thailand have increased in 2021, with over 5,000 tonnes exported to both destinations. The Canary Islands (4,690 tonnes) and Israel (3,664 tonnes) continue to be important markets, while there was the welcome return of Russia as an export destination for the first time in over five years.

At the end of January, Egypt informed trade partners of its intention to establish a pre-clearance import regime for seed potatoes for the 2020/21 season. The proposed protocol has been met with concerns from both UK and EU exporters who have highlighted the requested information will not be readily available in the timeframe outlined. Therefore, the Egyptian authorities have confirmed that the application of the import mechanism will be postponed until 2022 because of the ongoing pandemic and to allow for collaborative dialogue with exporters and officials to resolve their concerns.

The EU undoubtedly remains an important market for our seed potato exporters. However, the recent Egyptian activity also highlights that we have other international customers who also require due care and attention to ensure that our seed potato exports flourish and thrive in a post-Brexit world.

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TOP OF THE CROPS

Mark Topliff, AHDB Lead Analyst in Farm Economics, looks at how the crops that are benchmarked in Farmbench have performed over the last four years and which returned the best margins.



From the 2017 to 2020 harvests, AHDB has examined nearly 7,900 crop-enterprise performance results in Farmbench for conventionally grown combinable, potato and sugar beet crops. Of the combinable crops, winter wheat and oilseed rape returned the biggest margins of all the crops, based on all four years in the top 25% performers. Overall, Farmbench users also confirmed that winter combinable crops are more profitable than combinable spring crops. Apart from linseed, all other top 25% performing crops produced a positive four-year average net margin, while for the middle 50% of performers, only winter oats and wheat returned a positive margin.

Gross margins

For combinable crops, winter wheat produced the highest gross margin for all the performance groups, followed by winter oats and winter oilseed rape. Sugar beet gross margins were very close to winter wheat, but potatoes had the largest gross margins overall.

Across all the crops (Figure 1), the middle-performing group gross margins were one-quarter to two thirds lower than the top 25%. The bottom quartile had on average a similar one-third lower gross margin compared with the middle 50%.

Net margins

The top 25% performers, apart from linseed, achieved a positive net margin averaged over the 2017 to 2020 harvest years. When it comes to the middle 50%, only winter wheat, winter oats and potatoes returned a positive net margin per hectare after all costs considered.

When accounting for the yield (Figure 2), the order changes slightly. In the top quartile, oilseed rape becomes the highest net margin per tonne by a combinable crop, followed by feed peas and winter wheat. However, the middle 50% order is similar to the per-hectare results of potatoes, winter wheat and oats. With the exception of barley, the other winter combinable crops outperformed their spring equivalents by £10–13/tonne in the top quartile. The range was £7–41/tonne in the middle 50%.



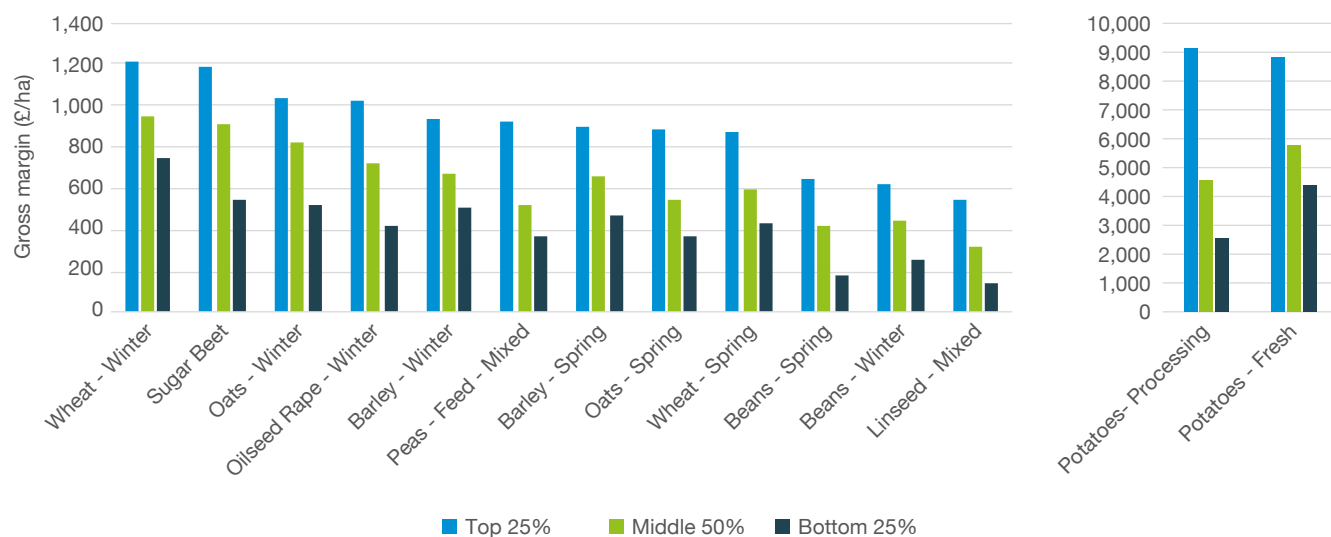


Figure 1. Four-year average gross margins by performance group

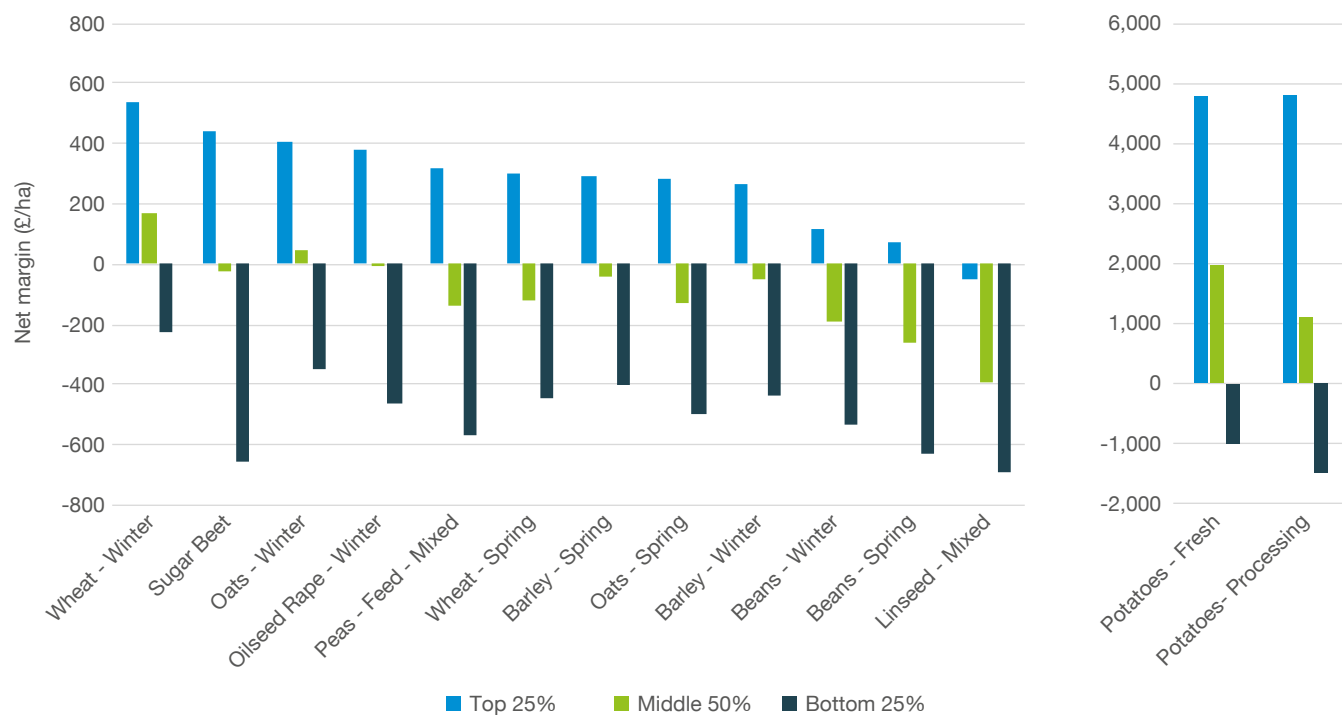


Figure 2. Four-year average gross margins by performance group, where net margin is crop income minus all costs, including the value of unpaid labour, rental value of owned land and depreciation. Subsidies are excluded

Table 1. Net margin average for 2017 to 2020 (£/t)

Four-year average (2017–20) Net margin (£/t)	Top 25%	Middle 50%	Bottom 25%
Barley – Spring	42	-6	-74
Barley – Winter	32	-7	-68
Beans – Spring	13	-78	-266
Beans – Winter	25	-71	-240
Linseed – Mixed	-43	-291	-652
Oats – Spring	42	-24	-109
Oats – Winter	55	7	-65
Oilseed rape – Winter	92	-8	-224
Peas – Feed – Mixed	73	-522	-187
Potatoes – Fresh	74	31	-32
Potatoes – Processing	94	26	-38
Sugar beet	6	-1	-11
Wheat – Spring	44	-22	-91
Wheat – Winter	54	19	-28

In conclusion

So what was top of the crops over the last four years? Aside from potatoes, the combinables of winter wheat, winter oats and oilseed rape performed well, both on a per-hectare and per-tonne basis. However, it generally requires a top 25% lower level of costs, higher yields and prices to achieve positive net margins.

So should the most profitable crop rotation include all these top crops? Well, things aren't that simple, of course. Potatoes is a specialist crop that requires the right soil types and a huge amount of investment and preferably a secured market. Oats can be a useful break crop, but, similarly, a contracted market outlet is preferable. It's no coincidence then that winter wheat and oilseed rape are sown by many growers due to their ready markets and, if good yields are achieved, then there are highly profitable returns.

Whichever crop is grown, optimising yields to the level of inputs and keeping a tight control on machinery and equipment costs will go some way to achieving top 25% performance. However, paying attention to detail in these areas, plus others, such as your marketing strategy, growing for a market, production system and crop rotation, can also really help performance.

ABOUT THE FIGURES

- Figures derived from AHDB Farmbench data: ahdb.org.uk/Farmbench
- Farmbench results from 2017–2020 harvest years (exceptions: Sugar beet: 2018–2020; Potatoes – fresh: 2017–2019; Potatoes – processing: 2018–2020)
- Based on 7,850 separate crop enterprise results
- Figures used are conventionally grown crops
- Performance groups are ranked on full economic net margin
- Full economic means they include all non-cash costs to the business, which are the costs you can't see going out of your bank account – machinery and buildings depreciation, unpaid labour and the rental value of owned land

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Our strategy and approach TO OILSEED RAPE

With oilseed rape (OSR) production volatile, AHDB Cereals & Oilseeds Strategy Director Martin Grantley-Smith outlines how our renewed focus will tackle this head on to help smooth future production.



KEY AREAS OF FOCUS

- Ensuring the Recommended List helps to drive varietal improvement, including:
 - Resistance to CSFB, recovery from attack and promoting impact-mitigating physical characteristics, such as vigour – such a focus on genetics has been particularly successful in Canada
 - Enhancement of other key variety traits, such as resistance to clubroot, verticillium stem stripe, *Turnip yellows virus*, phoma, slugs and pigeons
- A thorough understanding of CSFB life cycle, including migration
- Monitoring RNAi biocontrols, including any effective for Colorado potato beetle control that may transfer to CSFB, and other ‘novel’ treatments (e.g. bioseed treatments and biostimulants)
- Better understanding of establishment conditions, especially moisture availability, and the impact on the crop (e.g. CSFB damage)
- Improving agronomic techniques, such as drilling dates, soil health, post-emergence crop nutrition and protection
- Supporting development of a rapid, readily available on-farm test to monitor erucic acid levels
- Development of clear-out programmes to remove residual infestations, including exploration of wider crop options to aid this

What is the current state of play?

The production of wheat often greatly benefits from having OSR in the rotation. There are few alternative break crops that have such a beneficial effect with good market opportunities, which can also be grown widely in the UK. With this in mind, our OSR strategy addresses wider crop rotations and potential policy developments, alongside managing cabbage stem flea beetle (CSFB) and other important pests and diseases.

Many growers still manage a successful crop and OSR continues to play a vital role in the rotation. However, the industry needs help and support to reverse the downward trend in area planted.

CSFB and our IPM programme

Our integrated pest management (IPM) approach focuses on ‘prevent, detect, control’. Using this approach, we will continue to identify tools and techniques that can be used to reduce the level of CSFB, reduce its impact and strengthen the recovery of the crop. Given that there is no single technique with a complete pest-suppression effect, we will monitor new developments in the UK and from across the world.



“ Our integrated pest management (IPM) approach focuses on prevent, detect, control ”

Getting results to you

We have made significant strides in digital communications, especially in the Knowledge Library on our website. This has been optimised to make it easier for search engines to find the content that matters to you. For the latest information on CSFB, simply visit: ahdb.org.uk/csfb

All the latest developments on our information, services and tools will also, of course, continue to be discussed via our popular Monitor and Strategic Farm networks and agronomy events. We will also continue to support the Oilseed YEN (Yield Enhancement Network), which is a key platform for farmer innovation and sharing best practice.

OSR cost-effectiveness

One of the main issues is knowing, from a financial perspective, whether OSR is the best option. AHDB Farmbench gross-margin data allows us to study the effects of widening and varying rotations, with OSR both as a main crop and rotational crop, against its alternatives. It also allows us to take into account the production of wheat and alternative break crops. In our strategy, we will continue to develop, share and use financial analyses to guide

cropping decisions. This will also include the use of international benchmarking to identify how production in other countries compares with that in the UK. Finally, we will continue to support monitoring of regional risks and map out high-risk zones.

In order to gain the greatest impact, AHDB will work in partnership with commercial and non-profit bodies, the research community, grower organisations and advisers to deliver our strategy. Our priority will be to collate information, fill knowledge gaps and provide access to this information in a readily usable format.

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Risky business: **CAN DSS NARROW THE ODDS ON MAKING BETTER CHOICES?**



Emily Pope, Senior Knowledge Transfer Manager, explains AHDB's collaboration on a pan-European project to put robust decision support systems (DSS) at your fingertips.



In June 2019, an ambitious EU-funded project got underway. Working with 27 partners from 12 European countries, IPM Decisions aims to review DSS, uses insights into how farmers and agronomists make decisions and will make robust DSS available through a free-to-access online platform.

WHAT IS A DECISION SUPPORT SYSTEM (DSS)?

DSS refers to any system/tool designed to help people make more effective decisions. An example includes the AHDB BYDV (*Barley yellow dwarf virus*) tool. This uses regional temperature data (observed/forecast) and cereal crop emergence/last-spray-date information to help identify crop monitoring periods and the requirement for any subsequent spray.

DSS use

In 2020, workshops revealed that one-third of farmer participants do not use DSS directly. However, agronomists may use tools on their behalf. It also found that 45% of agronomists use the same tools as their client, whereas 30% use different tools.

Farmers were also asked to identify the most important features of a DSS. The most critical feature was to make it easy to use with site-specific information, including being able to locate the farm and access the nearest weather data. The next crucial feature was for the DSS to handle several crops, followed by multiple pests, weeds and diseases.

DSS accuracy

Most agronomists across Europe (62%) think DSS are accurate. However, in the UK, only 20% agree, with the finger pointed at our highly variable weather. But it is important to remember that complete 'accuracy' is not the aim of the game. DSS can only pinpoint more-likely scenarios. They are designed to 'support' decisions, not make them. The survey results back this up – most farmers (92%) and agronomists (85%) believe that DSS improve their decision-making.

DSS risk

It is critical that DSS help people make better decisions most of the time. According to an earlier AHDB survey, a small number (10%) of respondents said that inadequate estimation of aphids and risk resulted in BYDV symptoms in their crops. However, DSS are unlikely to replace the need for regular crop inspections – the best estimates will always be based on levels observed in actual crops.

The new platform will make it clear which DSS are available and make it easier to select the right ones for specific situations. It will use a traffic-light system to indicate the level of risk and, to make sure you don't miss anything, will also issue alerts (e.g. via email or text).

However, knowing the level of risk is just one step in the decision-making puzzle. A potentially trickier step is understanding how you and the people around you perceive and respond to risk. We dug into risk attitudes at the workshops too. For example, we asked people if they preferred a 100% chance of winning £1, a 10% chance of winning £10, or something in between. This showed that agronomists are more inclined to take risks, compared with farmers.

Sharing with others

When making joint decisions, it is important to consider attitudes to risk, and the platform outputs can help promote a healthy discussion. Collaboration is at the heart of effective integrated pest management (IPM), whether that's between a farmer and an agronomist or between neighbouring farms (for landscape-scale interventions). Encouragingly, almost 80% of respondents said they were willing for their data to be used anonymously to create and enhance publicly available risk maps.

Get involved

The prototype platform is due out later this year, giving industry the opportunity to test how it could work. If you want to help us improve it over the next three years, please get in touch.

IPM Decisions (Project 817617) receives funding from the EU's Horizon 2020 research and innovation programme. For further information, visit: ipmdecisions.net

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Putting analysis into practice with **YEN NUTRITION**

Emily Pope, AHDB Senior Knowledge Transfer Manager, explains how our previous Truro Monitor Farm hosts use the network to help improve their nutrition.

Howard and Anne Emmett, along with their daughter Katie, farm an all-arable unit in Cornwall and spent three years as Truro Monitor Farm hosts from 2016–2019. Spanning 192 ha, with a further 49 ha contract farmed, medium and heavy soils support a rotation which includes field beans, oilseed rape, winter wheat, winter barley and spring barley, with extensive grain storage available.

After winning the award for highest wheat yield in the South West at 10.3 t/ha in 2018, Howard and Katie became members of YEN Nutrition to further explore nutrient management. Katie explains: “We need to farm the best way that we can to look after the fields but also gain the returns to be able to carry on. We’re hoping for YEN Nutrition to allow us to improve profitability through further analysis.”

What is YEN Nutrition?

Members of YEN Nutrition receive a grain sampling kit to analyse six (or more) grain samples for all 12 essential nutrients.

THE 12 ESSENTIAL NUTRIENTS

- | | |
|--------------|--------------|
| • Nitrogen | • Manganese |
| • Potassium | • Zinc |
| • Phosphorus | • Copper |
| • Sulphur | • Iron |
| • Calcium | • Boron |
| • Magnesium | • Molybdenum |

Samples are taken from each load to get a representation of the whole field. These samples are then sent to the lab, with the farmer reporting on the yield estimate per field and whether any straw was removed. Through membership of YEN Nutrition, farmers are then provided with three reports which are generated using the data from these samples, one of which is the Nutrient Benchmarking Report.

Nutrient Benchmarking Report

The Report is used to identify which nutrient deficiencies may have limited each crop’s yield – something which the Emmetts were keen to identify. Members of YEN Nutrition then share their results so that their crops can be benchmarked against comparable crops grown within the same season. This helps to identify any potential deficiencies, independent of seasonal effects (with 2020 being a very abnormal year for weather). The results act as a starting point for change and allow farmers to establish suitable crops for the soil type, see if any extra applications, such as lime or gypsum, may need to be considered and also help to establish what to look out for in the season.

Thoughts for the season ahead

Using information from the YEN Nutrition programme, Howard and Katie reflected that, in general, their nutrients were in line with what they should be within their area and for their soil type, particularly with regards to P and K. Consequently, rather than increasing or decreasing inputs, they will focus on the timings of applications in the season ahead.

Establishment has improved due to the drier autumn, so they can experiment more with chemicals for a better plant, while Howard would also like to introduce organic crops to further improve nutrients and soil organic matter. Additionally, having recently purchased a flexi-harrow, the Emmetts are not planning to invest further in new machinery in order to keep costs low.

Three questions to ask on the back of the benchmarking report

1. How do we better balance nutrition and chemical inputs?
2. How do we combat potential nutrient lock-out?
3. How do we use the data going forward?



Looking to the future

As a result of lower yields, Howard and Katie have decided to stop growing field beans after four years in the rotation: “With the changing weather patterns, it’s important for us to have the full picture and not just rely on an agronomist. To keep our soil performing, we need to look after it, and the nutrition reports help us to understand how.

“These reports are encouraging us to do more research into soil health and understand how methods such as cover cropping can affect all 12 essential nutrients. Farmers may tend to focus on a few, such as nitrogen and magnesium, but it’s important to monitor all 12. Looking forward, it will be important to get the balance of inputs correct, as environmental issues, such as carbon, come into play.”

If you would like more information about YEN Nutrition or would like to get involved, please visit:
yen.adas.co.uk



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The comings and goings at **STRATEGIC CEREAL FARMS**

Emily Pope looks at new host David Miller's use of regenerative agriculture and the departing Rob Fox's success in the West.

New Strategic Farm reaps regen rewards

For the past decade, David Miller, Farm Manager for the 700-hectare Wheatsheaf Farming Company in Hampshire, has used regenerative agriculture practices to regain control of the soil. With the farm mainly situated on grade 3 land, David has used the principles of regenerative agriculture to trial three different approaches to help the soil look after itself with minimum inputs:

- **Use of cover**

Diverse mixtures of species that succumb to frost are used to avoid sucking up all the nutrition and the remaining cover is tackled by rolling after frost

- **Minimum soil disturbance**

Disruptive methods are only used when required. Using a cross-slot drill made the land easier to work and David now uses a more nimble disc-drill system

- **Rotational diversity**

Introducing new cash crops into the rotation, alongside cover crops, increases diversity and flexibility. Livestock are not part of the rotation so as to minimise the risks of compaction.

A simple and cost-saving system, the farm's dependence on plant protection and fertiliser products has reduced and there are more beneficial insects on the farm. Environmental schemes also help pay for the cover crop seeds.

The Strategic Farm platform

David is looking to continue his regenerative agriculture work as a Strategic Cereal Farm host to help him find a responsible pathway to reduce inputs. During the first year, David will carry out baselining of farmed environment indicators, such as reliable carbon and depth measurements, biological assessments and pests and natural enemies.

He will then carry out trials to investigate specific areas of interest – something he is looking forward to embracing: “We are very pleased to have been chosen as the next AHDB Strategic Cereal Farm. We aim to look at ways of quantifying the results of our actions in growing crops in a more biological way with less reliance on chemicals and inorganic fertilisers. The end result will, hopefully, give a reliable path of principles for others to follow.”

Sustainability significance

David also feels that this work is of particular relevance in the current climate: “Farmers in the UK are at a historical turning point with the new Agriculture Bill and our exit from the European Union. The future must be more sustainable.”

To read more about David's regenerative agriculture work, please visit: ahdb.org.uk/news/hampshire-farmers-reap-regen-rewards





Putting research into practice

During his time hosting both Leamington Monitor Farm and Strategic Farm West in Warwickshire, Rob Fox has been keen to implement the results of technical trials on a whole-farm scale and share his experiences with other farmers.

Rob has tested a range of research outputs, such as the AHDB BBRO soil health scorecard, to evaluate cultivation systems. Testing alternative soil management practices was particularly important on the farm's heavy clay, with shallow cultivations resulting in greater rooting in the subsoil and increased above-ground crop biomass in wheat. For oilseed rape establishment, it helped maintain moisture levels and resilience to cabbage stem flea beetle.

Difficult autumn conditions in 2019 resulted in much of the farm being drilled in the spring. Keen to make the most of the opportunity, Rob investigated the role of a summer catch crop which provided cover and captured useful amounts of nitrogen.

Over the last three years, Rob has tested a range of approaches to prevent, detect and control a variety of pests, weeds and diseases. He has used crop monitoring, forecasting tools and thresholds to reduce fungicide input, while managing disease, maintaining yields and reducing the cost of production.

Flower and grass strips have also been established across the farm on field boundaries and within the growing crop. Although only established for two years, there is already evidence that they are providing refuge and winter habitat for important natural enemies, including ground beetles and spiders.

Rob said: "My time as a Strategic Farm host has been a great experience and I am sad to be leaving. I hope farmers will use the information coming out of the Strategic Farms to encourage them to try out more things on their farms. The remaining and new hosts have the future of the industry in mind and I will be watching future Strategic Farm trials intently."

To find out about our online research events in June, topical challenges facing farming businesses and to learn more about the Strategic Cereal Farms, please visit: ahdb.org.uk/farm-excellence

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SPOT SCOTLAND'S successful first year



Antonia Walker, AHDB Senior Knowledge Transfer Manager – Potatoes, looks ahead to the next twelve months of trials at Strategic Potato Farm Scotland.





SPot Scotland host Jim Reid farms at Milton of Mathers, St Cyrus in Angus, and is pleased with his first 12 months of on-farm trials. During the next year, work covering PCN, cultivation, IPM virus control and desiccation will be at the heart of the trial and research programme, with support from AHDB, McCain, Scottish Agronomy and Soil Essentials.

The challenges of 2020

Looking back on last year's work, Jim, who farms alongside his brother Ron, said: "Last year was a challenging growing season due to the weather: a very dry spring, followed by a particularly wet autumn around harvest time.

"I am pleased with the results we have seen from the 2020 trials. They reinforce my belief that attention to detail is key to ensuring that we continue to supply clean, healthy seed potatoes. We are a family business, which allows us to work closely together and I believe this makes us more sustainable in our approach to seed potato production."

As Jim explains, the second year of the programme will see the continuation of trials concerning the management of PCN and look at IPM strategies with the aim of reducing virus risk in seed crops: "For aphid virus control, we will continue to measure aphid activity and monitor levels of virus in following crops.

"We have seen that setting up crop boundaries using cereal purge strips impacts virus levels. We will therefore continue to trial the use of flower strips for intercropping, creating corridors to increase biodiversity, which is useful for later-season infection."

Continuation and progression

In addition to continuing the trials from 2020, Jim will also trial new techniques, such as straw mulching and including the use of mineral oils for aphid control. This work is based on initial results from a first-year research project conducted by NIAB: "We know that aphids are drawn to bare soil and we hope to demonstrate that using a straw mulch reduces the chances of aphids feeding on the potato crop and spreading potential virus infection. The contrast between the crop and soil will be minimised, which we hope will reduce the likelihood of attracting aphids to the field."

This work is based on results from a Swiss researcher, whose approaches were evaluated in an AHDB research project last year. Mineral oils were tested in combination with other options, such as straw mulch or intercropping. The mulch and mineral oil combination looked promising and will be tested in the research project again. Both SPot Scotland and SPot East are also interested in looking at oils and/or mulch.

"We also plan to test mineral oils, which we hope will help protect the potato plants from virus early in the season," said Jim.

In addition to PCN, cultivation and IPM work, desiccation is also a key area of interest at SPot Scotland following the removal of diquat, with Antonia Walker describing its importance: "Desiccation is a critical stage in seed multiplication and has the potential to have large-scale consequences in the following year's crop. We have seen that the choice of desiccation treatment, and how well it has been carried out, can make big differences to the quality of seed produced.

“ AHDB has been running trials across its SPot Farm network since 2018 to look at alternatives to the use of the herbicide diquat, which causes desiccation in potato plants. The desiccation trials we ran in 2020 looked at different methods of mechanical and chemical controls of vigorous haulm canopy growth in potato crops ”

As Antonia describes, the SPot Scotland desiccation trials have shown that slower treatments have a higher level of virus and late-season infection is becoming more of a concern: "With the introduction of new regimes, there is a need to highlight to potato growers that there is a risk of virus and disease threat if they do not follow an integrated approach to new desiccation regimes."

The trials also found that virus risk is increased from regrowth after mechanical desiccation methods such as flailing, with the timing of applying treatments found to be another important factor. Small details, such as treating the underside of leaves rather than the tops of the leaves, were also found to make a real difference.

For more information about SPot Scotland, including details on the trials and research, please visit: ahdb.org.uk/spot-farm-scotland-milton-of-mathers-farm

For more information about the work across all our Strategic Potato Farms, please visit: ahdb.org.uk/strategic-potato-farms

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“ The trickle system used almost 1000 m³ per hectare less than the boom and gun methods, while still achieving a similar quality ”



TO DRIP or not to drip?

Amber Barton, Knowledge Exchange Manager – Potatoes, explains what you may need to weigh up if you're considering drip irrigation for your farm.





In 2019, we set out to see whether the type of irrigation system used at SPot North, based at RJ and AE Godfrey situated on the Yorkshire and Lincolnshire border, could impact the quality of their crop. We split a field equally between drip, gun and boom systems and found no significant yield or size differences.

For our 2020 trials, host farmer Will Gagg wanted to expand the trials to a larger, more challenging site to really test the systems. The aim was again to see if there were any major quality differences in pack-out. The new Wold site had a much higher incline, with a slight slope down the length of the field. The sandy soil on this site had a higher stone content.

Here, we take a look at what the trials highlighted and what has been learnt.

Assessing yield and quality

As with the 2019 trials, we found no significant differences in terms of crop quality. There was only a variance of 1.75 tonnes per hectare between the best-performing (gun) and worst-performing (trickle) systems, which is not statistically relevant enough for us to draw conclusions. The pack-out yield for trickle was 80%, whereas gun achieved 85%, with boom slightly behind at 84%.

Although Will felt the trickle crop looked fractionally healthier in field, the tuber numbers were very similar in the three plots. We also assessed the breakdown of the type of waste in the crop and again found no major differences between the three systems. As the trickle plot was at the top of the slope, this could account for some of the small differences we saw.

Saving water

One important factor the trials did highlight was that drip irrigation uses significantly less water than the other systems. In fact, the trickle system used almost 1000 m³ per hectare less than the boom and gun methods, while still achieving a similar quality.

It's difficult for us to effectively compare costs, as the rates of running boom and gun systems varies significantly from farm to farm, depending on factors such as the age of the machinery. However, we estimate the initial set-up for 10 hectares as £24,875, with the average annual cost around £732 after the first year.

The practicalities

The new field site did throw up one significant challenge to the drip system. On the silt soils in the first-year trial, the system ran perfectly, with only around 12 breaks, which were relatively easy to fix. This year, there were 164 breaks in the system, which obviously caused additional labour costs.

Will believes the extra damage was down to the practicalities of the site. The stones in particular caused a challenge, but also birds tapping the pipes; perhaps more scarecrows are needed!

A further benefit of the drip system is that the crop could still be watered during spraying and there was no need to wait for the ground to dry before sending the sprayer through.

IS DRIP IRRIGATION RIGHT FOR YOUR SITE?

- More efficient in its water use than gun or boom
- Useful where you have low water availability
- Stony soils may cause more damage to drip systems than silt soils
- Birds may need to be kept at bay
- Additional labour costs may be needed for set-up and monitoring for breaks

Potential developments

For RJ and AE Godfrey, the trials have reassured them that they are doing a good job with the gun system. They will, however, be looking to use trickle irrigation in the areas of the farm that don't have access to as much water as other well-resourced areas.

If you'd like to find out more about our irrigation trials at SPot Farm North, you can watch our webinar featuring Will Gagg at: ahdb.org.uk/strategic-potato-farms

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