Grain
OUTLOOK
THE JOURNAL FOR CEREALS & OILSEEDS
AHDB
Summer 19

## BARLEY & BROME

It might not all be bad news after all, following further trade negotiations between the UK and China

## ARE YOU SPENDING TOO MUCH ON YOUR MACHINERY?

An investigation found that growers were putting too much money into their machinery. How does your spending stack up?

# PUTTING APHIDS ON THE MAP

All cereals will be drilled without a neonicotinoid seed treatment this autumn. With the chemical safety net removed, management will need to adapt

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Picture credits

Page 1: Dewar Crop Protection. Page 8–9: Game & Wildlife Conservation Trust, Dewar Crop Protection, Agrii. Page 12: Simon Cowell. Page 28–29: Shoreham Port.

# LETTER FROM THE EDITOR

## ELEANOR HOLDSWORTH
## EDITOR

When I was preparing this edition of Grain Outlook, the legendary 'Chinese' curse came to mind: may you live in interesting times. It turns out it's not Chinese at all, but that's by the by. We do live in interesting times at the moment, with change and doubt seemingly around every corner. At the time of writing, politically we're still in a sort of no-man's land, with no resolution to the Brexit impasse visible in the near future.

But these interesting times give us as an industry an opportunity to take stock, do things differently and get ready for whatever might be thrown at us. We can use it as a chance to build a stronger industry that's good for businesses and good for people too.

In this edition of Grain Outlook you'll find a range of information to help your farm business, from the latest independent agronomy research and consumer behaviour insight, to market intelligence and our work on your behalf negotiating trade details. We've also featured our seven new Monitor Farm hosts – find out more about them on page 23. As always, this magazine is only a snapshot of the work we do for you, so please do get in touch with your local Knowledge Exchange Manager (see pages 32–39) to find out more.

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# VIEW FROM THE CHAIR

## PAUL TEMPLE
## AHDB BOARD MEMBER
## SECTOR CHAIR FOR
## CEREALS & OILSEEDS

The Brexit delay has certainly caused uncertainty and a variety of responses, from those that want to wait and see to those that made immediate plans for the worst-case event. AHDB has produced a constant stream of first-class information and analysis to help the thought process and how it may affect the individual business in all situations.

The work involved in benchmarking has produced, for many, the first comparative analysis of their business against others within a region and has been well received. It has been great to see the level of interest and positive discussions it has generated. All of which will be important regardless of the political future.

Having spent some time meeting a number of grain exporters this year, you realise how well served we are by both big and small companies that are up for the challenge of selling UK grain overseas. It has been a difficult couple of years having little net surplus and this has restricted investment, but we have a good name, particularly for quality malting barley and soft wheats. Taking the chance to speak with merchants this summer to see what future requirements they have to maximise opportunities will be particularly important in regions with export potential.

This summer, we are making further efforts to reach out to levy payers with more Arable Connections events and I know the Cereals & Oilseeds board members share my enthusiasm for meeting levy payers first-hand. Your thoughts on IPM will be particularly useful as we look to direct future activity in that area.

# NEWS IN BRIEF

## GRAIN MARKET OUTLOOK CONFERENCE

Taking place on 15 October 2019 in London, this morning of in-depth market analysis and information will be free for all AHDB levy payers for the first time ever. For tickets and more information, go to **ahdb.org.uk/events**

## FARMING NEWS AND STORIES ON THE AIRWAVES

Subscribe to the AHDB podcast for practical farming know-how and stories from farmers and experts across the UK. Search your favourite podcast app for 'AHDB'.

## TWO NEW FARMER MEMBERS FOR THE BOARD

Former Monitor Farm hosts Russell McKenzie and Mark Wood have joined the AHDB Cereals & Oilseeds board, to help guide future activities and decisions to benefit the industry.

## TEACHER TRAINING

This summer, AHDB is working with the British Nutrition Foundation, via the Food – a fact of life website, to offer online training and webinars for teachers about where food comes from, healthy eating and healthy cooking.

**foodafactoflife.org.uk**

## INDUCTION FOR NEW AGRONOMISTS

AHDB will be holding its annual Agronomists' Induction on 22–23 October. The event introduces new agronomists to AHDB staff and services, as well as providing information on integrated pest management (IPM). Topics will include pest and disease management, monitoring and forecasting, soil health and crop nutrition. The induction will be relevant for new agronomists, covering arable, horticulture, grassland, sugar beet and legumes. Third parties and research organisations including BBRO, PGRO and LEAF will also be involved on the day.

If you are a new entrant to agronomy and would like to learn more, please call 024 7647 8928.

**ahdb.org.uk/events**

## AGRESPECT

There are thousands of LGBTQ+ people in the countryside. AHDB supports Agrespect to help unite, celebrate and encourage inclusiveness in rural communities. Agrespect promotes the countryside as a vibrant, tolerant and welcoming place for everyone, irrespective of gender, ethnicity or sexual orientation. Look out for the Agrespect tractor at this year's Brighton Pride.

**agrespect.com**

## DON'T BRING IT HOME

The pig industry is facing its greatest threat since foot-and-mouth disease in 2001. African Swine Fever has been steadily moving westward through Europe in the last few years to reach Belgium most recently. Some of the cases have been caused by pig meat from infected animals accidentally finding its way into pig diets. The industry needs all pig producers, farmers and the public to pull together to keep this disease out – in particular, by not bringing pork products home from holidays abroad or feeding scraps to pigs.

**ahdb.org.uk/knowledge-library/african-swine-fever**

## NEW PRODUCTS DELIVERED BY SCEPTREPLUS

Four new plant protection products are now available, following successful trials in SCEPTREplus and support from the AHDB minor use programme.

Emerger can be used for pre-emergence weed control on carrots, onions, herbs and outdoor sunflowers. Prolectus and Frupica SC fungicides are available for ornamentals to control grey mould and powdery mildew and Mainman as a pesticide for aphids on peppers and chillies.

**horticulture.ahdb.org.uk/sceptreplus**

## EXPANDING DAIRY NETWORK

AHDB has been awarded £1 million from The Betty Lawes Foundation to recruit an additional eight strategic dairy farms. The funding will enable us to expand the network to 25 farms across Great Britain, further improving opportunities for farmer-to-farmer learning and showcasing best practice on farm.

**dairy.ahdb.org.uk**

## POTATOES IN PARLIAMENT

Amid Brexit uncertainty, a group from the AHDB Potatoes Next Generation visited Westminster on 26 March. They gathered on Parliament Square to witness MPs rushing to cast their votes and TV crews hungry for coverage, before a tour around the Houses of Parliament.

The 15-strong group then headed to the National Farmers Union (NFU) headquarters in Westminster for a political briefing. This prepared the group well for the afternoon session – a round-table discussion with seven MPs from agricultural constituencies, including Chief Secretary to the Treasury, the Rt Hon Liz Truss MP.

**potatoes.ahdb.org.uk**



# **STUDENTS' UNION:** RESEARCHERS WEIGH IN ON THE DEBATE


## Jason Pole, AHDB Communications Manager


**Specific weight (SW) is one of the longest-standing ways of judging cereal grain quality. However, recent research has upturned the assumption that it is a good predictor of the nutritional value of wheat. Now, an AHDB PhD studentship aims to pull apart the measure in barley.**

Aaron Hoyle started to investigate the components of SW in malting barley back in 2016. With a little over one year left before his work completes, his early results look set to question the validity of SW as a top-line malting quality indicator.

SW is the weight of grain in a defined volume. Reported in kilograms per hectolitre (kg/hl), a high SW is believed to indicate a high starch content. During the malting process, starch is converted to maltose, so it's clear to see why high-SW barley is desirable.

However, headline SW can mask tremendous variation in the traits responsible for malting efficiency. So, the team Aaron works with at SRUC studies two key SW components: packing efficiency and grain density. The former measures how much of the bulk volume is actually occupied by the grain and the latter concerns what the grain is actually made of.

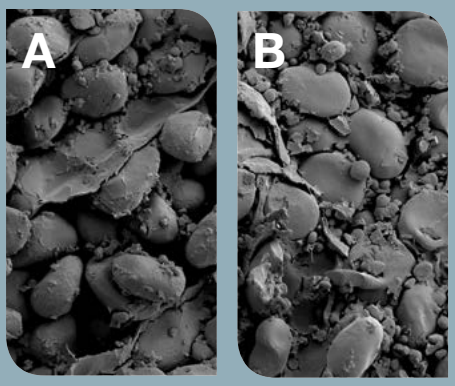
Nine spring malting barley varieties, known to give a wide range of SW and screenings, have been grown in field trials. The grain harvested has been analysed in meticulous detail. For each variety, 100 representatively sampled grains have been measured (length, width and depth) and weighed, with significant differences observed.

Further grain samples from each variety have also been sieved into various grain-size fractions to see how size affects SW. This found significant differences between the largest and smallest fractions for five varieties. Here, the shorter, thinner grains had a higher SW – shapes that are likely to be detrimental to malting performance. A further two varieties produced a relatively uniform grain size (in the medium-sized fraction). The results provide evidence that such components need to be taken into account in quality assessments.

As cereal grains come in a wide range of shapes and sizes, it is clear to see why packing efficiency could be so influential in the malting process. The amount of air around each grain dictates how much and how quickly water is imbibed during steeping. The same principles apply to air flow during kilning (evenly kilned malt is important). As grain density is also highly variable, Aaron is also taking apart this influential component, including looking at the role of starch quantity and quality (see image).

With the PhD project in its final year, Aaron will now draw conclusions on the relative influence to malting value of each SW component. Through understanding the building blocks of this quality measure, Aaron's research will help focus plant breeding efforts on the parts that really matter.

Understanding components of specific weight in barley grains – opportunities for improving grain quality and processing efficiency (21130047) runs from October 2016 to March 2020. The work is led by SRUC.




**Going with the grain: high-powered microscopes can reveal the building blocks of barley**

These grain cross-sections show 'A' (large discs) and 'B' (small balls) starch granules, as well as various other components (e.g. cell walls and parts of the protein matrix). From the same spring barley variety (Laureate), the images show that no two grains are the same

# ‘CLEAN’ GRAIN MYCOTOXIN MYSTERY CLEARED UP

**Jason Pole, AHDB Communications Manager**

**When cereal flowers are infected by the fungus *Claviceps purpurea*, the pathogen hijacks the developing grain and releases ergot alkaloids. These mycotoxins can spread to visually ‘clean’ grains. As the routes the toxin takes were uncertain, AHDB funded work to clear up the mystery.**

Each spring, ergot spores are dispersed on the wind. If one is lucky enough to land on an open cereal (or grass) flower, it infects the ovary. Here, the fungus takes control and transforms the grain site into a hard, black overwintering structure – called a sclerotium (plural, sclerotia) – that contains alkaloids. Back in the Middle Ages, consumption of these alkaloids was cited as the cause of ‘ergotism’. Symptoms included gangrenous extremities, convulsions, psychosis and death. Thankfully, agricultural practices and milling techniques have eliminated the risk of such exposure in modern times. The bottom line is that contamination is taken extremely seriously. European Union (EU) legal maximum ergot sclerotia levels are set at relatively low levels – 0.05%. UK standards go beyond this, with levels set at 0.001% for feed grain and zero tolerance for all other grain. The EU limits are also under review and, for the first time, a threshold for total ergot alkaloids may be imposed.

These potential changes mean the industry must get a better handle on the direct problem (i.e. the alkaloids), as well as its ‘proxy’ (i.e. the sclerotia). The fact that ergot alkaloids can contaminate grain that appears clear of ergot infection is a concern. As there is limited evidence to suggest that the fungus can grow past the base of the ovary, the NIAB-led research looked at other ways the toxins could be transferred.

Firstly, the researchers looked at whether the alkaloids are able to move between flowers on the ear. A single fungal isolate was used to infect spring wheat, spring barley and winter rye flowers. This resulted in the production of mature ergot sclerotia of various sizes and weights. Grain above and below the infected flowers was collected and tested. In wheat and barley, and to a lesser extent in rye, a broad range of alkaloids (up to 12 ergot alkaloids) was found in these ‘clean’ grains.

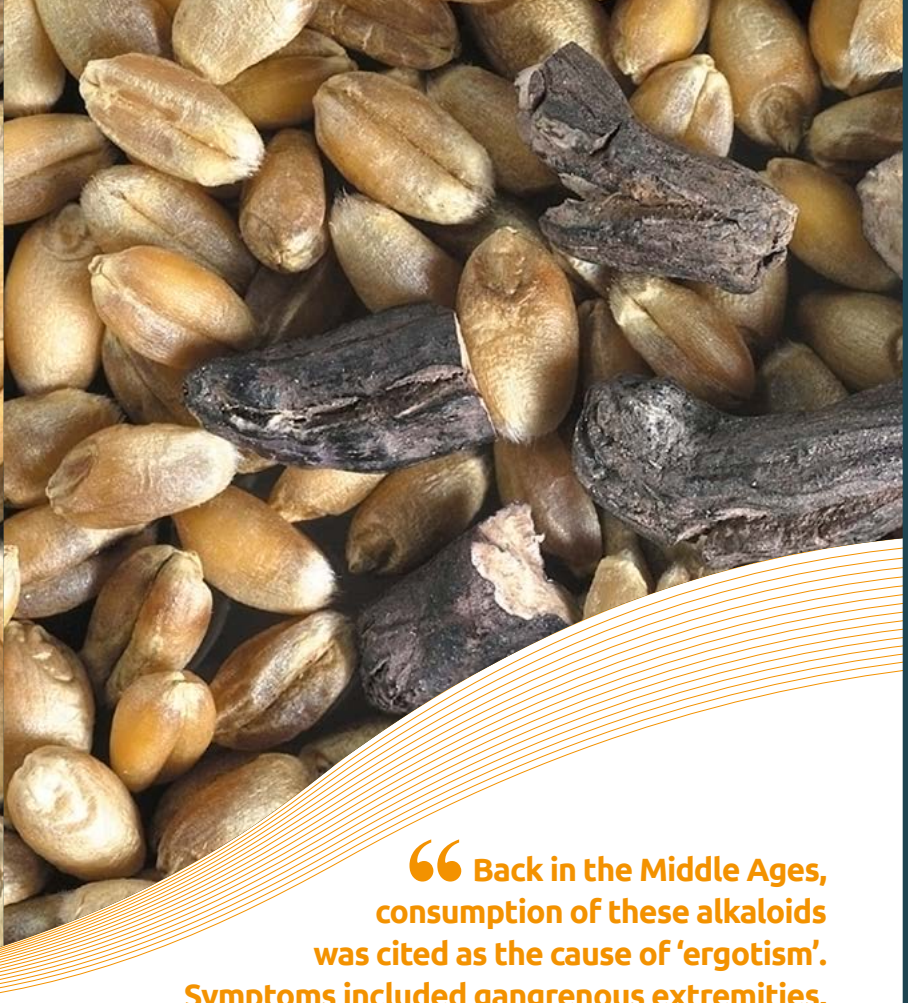
External sources of contamination were also looked at. A sweet-smelling sticky substance, known as ‘honeydew’, is released by infected flowers. The researchers tested honeydew, produced following infection with several isolates, and found that it contained ergot alkaloids. However, the levels were so low, it was deemed that this potential source of contamination could be ruled out.

Contamination post-harvest was also investigated. The presence of whole ergots in grain at the current EU maximum

### Did you know?

**AHDB has funded independent monitoring of agrochemical residues and contaminants including mycotoxins since the mid-1980s.**

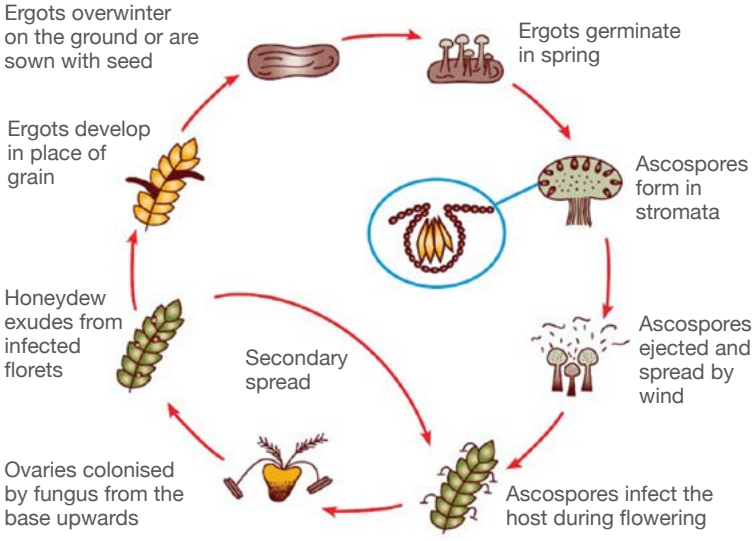
**This article is based on AHDB final project report 603: ‘Determining the routes of transmission of ergot alkaloids in cereal grains’.**



> **Back in the Middle Ages, consumption of these alkaloids was cited as the cause of 'ergotism'. Symptoms included gangrenous extremities, convulsions, psychosis and death**

levels led to relatively low levels of alkaloid transfer (3–15 parts per billion). The presence of broken and damaged ergots at the same level, however, led to a much higher transfer (66–229 parts per billion).

Dhan Bhandari, who manages grain quality research at AHDB, said: "The higher ergot alkaloids levels associated with grain fragments are significant, as they could breach proposed maximum levels."




*Claviceps purpurea* life cycle

Black-grass heads infected with ergot (Image source: AHDB Encyclopaedia of cereal diseases)

## ERGOT MANAGEMENT

**The strict legal and contractual maximum levels for ergot sclerotia in grain mean ergot must be managed both before and after harvest.**

**All cereals are susceptible – in order of decreasing susceptibility: rye, triticale, wheat, barley and oats. Ergot is also relatively common in wild grasses throughout the UK. Black-grass is a particularly key source of spores and its management is crucial. It is also good practice to harvest field headlands and tramlines separately from the bulk of the crop, especially where ergot infection is present. For these higher-risk fields, a non-cereal crop should be considered. If cereal is planted, then the field should be ploughed first to bury any ergot to a depth of at least 5 cm. Varieties with a shorter flowering period also pass through the key infection risk period faster. Finally, where farm-saved seed is used, it should be cleaned thoroughly to remove any ergot sclerotia.**

**Information on ergot and its management in cereals can be found on the AHDB website: ahdb.org.uk/ergot**

# PUTTING APHIDS ON THE MAP

**Jason Pole, AHDB Communications Manager**

**All cereals will be drilled without a neonicotinoid seed treatment this autumn. With the chemical safety net removed, management will need to adapt. Some people will draw upon age-old experience, some will enter into the unknown. No matter which camp you sit in, AHDB information can help you map the management solutions.**

The aphid control exerted by seed treatments helped reduce the spread of yield-limiting barley yellow dwarf virus (BYDV). Critically, the guard was kept up during the vulnerable early stages of the crop, until the chemistry ran out of steam (usually about four to six weeks after drilling). At this point, weather then became friend or foe, with low temperatures needed to dampen down aphid activity.

With the loss of neonicotinoids, the virus and its aphid vectors need to be understood more than ever. The aphid species responsible are known but the amount of virus they carry is unclear. However, only a small proportion of aphids need to carry BYDV to result in crop losses. It's why aphids are treated as if they are infected. But this is not a licence to spray. A great deal is known about aphid biology and this knowledge can be used to reduce the number of sprays required.

## BYDV TRANSMISSION

Winged aphids are the most common initial source of BYDV infection. It's one of the reasons AHDB supports the Rothamsted Research/SASA suction-trap network. The 12.2 m tall traps suck in air continuously. Emptied frequently, the aphid species are identified and counted, and the results are promoted via AHDB Aphid News. **ahdb.org.uk/aphid-news**

Another source of BYDV is from wingless aphids that move from grass, grass weeds (especially annual meadow-grass) or volunteer cereals from within the field. This is known as the 'green bridge' effect. Aphid colonisation is generally lower on fields with minimum tillage. Where fields are cultivated, aphids can survive under the ground, feed on crop roots and transmit virus.

BYDV does not pass to aphids' offspring. However, they can pick it up from feeding on infected host plants and transmit it again (in as little as 12 hours). In terms of control, it is the second generation that should be the target. This is the generation that tends to move away from the plant originally colonised. The speed at which this generation develops is driven by air temperatures. As part of the AHDB WeatherHub, a BYDV management tool was launched last autumn to help people calculate when the second generation is likely to appear (following crop emergence or insecticide treatment).

The longer the autumn resists the winter, the higher the virus risk to crops. If temperatures stay above 3°C, aphids remain active. However, virus inoculation efficiency decreases to 23–35% when average temperatures drop to 6°C.

## BYDV SYMPTOMS

Leaf yellowing and stunting symptoms appear in the spring. Initially, confined to individual plants scattered throughout the crop, eventually, distinct circular patches develop. Sometimes, these patches merge to form extensive areas of infection. Red tipping of upper leaves can also occur. In the case of severe infections, BYDV can cause losses of up to 60% in winter



Grain aphid



Bird cherry–oat aphid

> **“Another source of BYDV is from wingless aphids that move from grass, grass weeds (especially annual meadow-grass) or volunteer cereals from within the field. This is known as the ‘green bridge’ effect”**

wheat and 50% in winter barley. However, the occurrence of these levels of infection is rare.

## APHID VECTORS

In the South of England, the bird cherry–oat aphid (*Rhopalosiphum padi*) is the principal vector. In the Midlands and the North of England, the grain aphid (*Sitobion avenae*) is usually more important. Each species has its own behavioural quirks and AHDB research is helping to reveal these.

In the autumn, bird cherry–oat aphids usually fly in much greater numbers than grain aphids. This is because the former flies to bird cherry trees to overwinter. The latter aphid, however, overwinters in cereals and grasses. Because of this, grain aphids often get a head start in the spring. It’s also essential to note that moderate levels of pyrethroid resistance are widespread in the UK’s grain aphids.

As the amount of aphids varies on a field-by-field and within-field basis, AHDB has funded the Game and Wildlife Conservation Trust to map movement. They use yellow sticky traps to catch aphids in the field. They also look at how the local landscape and prevailing wind direction influence results. Results show aphid numbers are much higher towards field edges (up to 35 m in), with grain aphids more likely to hug the boundaries (up to 10 m in). Trees, understandably, provide a barrier to flying aphids. The research team also works with farmers to improve trap designs and placement and looks at the relationships between catches and observed BYDV levels. The influence of natural enemies, such as predatory beetles and web-spinning spiders, is also being studied.

### ON THE WEB

**Search ‘aphids’ on ahdb.org.uk for information on aphid life cycles, identification, risks and management (including the BYDV management tool, Aphid News and insecticide resistance status).**

# INITIATIVE USED TO COMBAT **BLACK-GRASS**

**Jason Pole, AHDB Communications Manager**

**Protein quantity and quality may be familiar concepts to growers of grain but pioneering research suggests that getting to grips with protein could also help lay the foundation for the next generation of weed control. It's one of many exciting avenues of exploration opened up by the four-year black-grass resistance initiative (BGRI).**

## PROTEIN POWER

The BGRI delivered a world-first: a pocket diagnostic tool that can be used to detect multiple herbicide resistance (MHR) in the field. Based on pregnancy test technology, it reveals if a protein known to be associated with MHR is present. Such proteins, in this case the 'AmGSTF1' protein, are called 'biomarkers'.

The test can diagnose the presence of MHR within 10 minutes of taking a black-grass leaf sample. It can also quantify the level of resistance – the stronger the test line on the diagnostic device, the more of the biomarker is present. With strong commercial potential, a company has recently agreed to commit to the long-term manufacture of the test kit.

The AmGSTF1 protein is now known to play a central role in the MHR in black-grass. In fact, the BGRI team believes it is likely to play a similar role in other grasses.

Paul Gosling, who manages weed research at AHDB, said: "The BGRI team identified several proteins associated with herbicide resistance. Interestingly, the mechanism of resistance was found to be similar to the one cancers use to develop resistance to drugs in humans. The AmGSTF1 protein biomarker identified provided the strongest test of the presence of MHR in black-grass."

It's certainly high science, but, through investigating such proteins and their interactions, complex resistance mechanisms can be better understood. In fact, based on study of both genes and proteins, the BGRI believes that there are at least three subtypes of MHR:

- Broad-ranging resistance to multiple chemistries
- Metabolic-based resistance to single classes of chemistry
- A herbicide-specific type

A thorough understanding of these subtypes, combined with sophisticated real-time diagnostics, could, theoretically, be used to identify bespoke herbicide strategies for specific field populations.

Visit **ahdb.org.uk/bgri** for more details, including:

- Results from one of the most comprehensive audits of herbicide-resistant grass weeds in the UK to date
- Data on the economic consequences associated with weeds, including resistant populations
- Information on weed management strategies (including evidence of why cultural control should always be used as a first solution)

## MAJOR SHAKE-UP OF WEED INVESTMENT REQUIRED

In addition to innovation, the UK must not lose sight of the basic principles of weed management. Worryingly, findings from a recent cross-sector review showed that basic weed management knowledge is at risk of being lost to the industry, forever.

> **The UK must not lose sight of the basic principles of weed management. Worryingly, findings from a recent cross-sector review showed that basic weed management knowledge is at risk of being lost to the industry, forever**

The UK has had a global reputation for being at the forefront of weed research. Over many decades, this activity laid the foundation for management. The ADAS-led review found, however, that the legacy of this research is being eroded. Key reference sources, such as those on basic weed biology, published by Defra and its predecessor MAFF, are gradually being lost. One of the review's recommendations was for the major sources of reference material to be identified and archived. The review also suggested that activity across cropping sectors needed to be coordinated much better to make the best use of depleted funds.

Joe Martin, AHDB senior crop protection scientist for weeds, said: "Chasing management of a specific weed with chemistry is a luxury in current times. The review found we should focus on 'broad-spectrum' alternatives that tackle weeds across entire cropping systems."

The full review, which provides in-depth information on the status of weed management and recommendations on investment priorities for the short, medium and longer term, can be accessed via **ahdb.org.uk/weedreview**

## PROJECT FACTS

Multiple herbicide resistance in grass weeds: from genes to agroecosystems. Duration (2014–2018). The BGRI was funded by a contract from AHDB (£280,000) and the Biotechnology and Biological Sciences Research Council (£2,520,000). Project partners: University of Newcastle, University of Sheffield, Rothamsted Research, University of Reading, University of Edinburgh and University of York.

Review of weed control options for UK crops. The review was funded by a contract from AHDB (£26,000) and BBRO (£10,000), and cash and in-kind contributions from other partners. Led by ADAS, the project had wide industry support and involved five manufacturers, three distributors, technology providers, key crop experts and CRD. The review covered cereals, oilseeds, horticulture, potatoes, sugar beet, legumes and grassland systems.

## FORMS OF HERBICIDE RESISTANCE IN BLACK-GRASS

### TARGET SITE RESISTANCE (TSR)

**Mutations in the proteins targeted by particular chemicals can make weeds less sensitive to them. This form of resistance is relatively well understood. It can be countered by the rotational use of herbicides with differing modes of action.**

### MULTIPLE OR METABOLIC HERBICIDE RESISTANCE (MHR)

**Weeds become more tolerant of a broad range of herbicides, irrespective of their chemistry or mode of action. Generally, this is due to the weed being better able to detoxify crop protection agents. MHR is also termed non-target site resistance (NTSR). As MHR is poorly understood, the BGRI focused on it.**

# ORGANIC MATTER AND THE MYSTERIES OF THE UNIVERSE

Jason Pole, AHDB Communications Manager

**In physics, there's a mysterious thing called dark matter. Many believe that the universe is dominated by it, although it is invisible. In farming, there's also a curious material at the heart of intense debate: organic matter. A new AHDB factsheet looks to take some mystery away from this carbon-rich substance. In this article, we look at what organic matter is, and how it can be measured and managed.**

Put simply, soil organic matter is all the stuff in the soil that is, or once was, alive. It includes crop roots, incorporated crop stubble, and manures and slurries. It is incredibly rich in carbon: in fact, it's more than half carbon. Researchers more often talk about soil organic carbon than soil organic matter, but these are just different ways of measuring the same basic soil property.

Over time, organic matter mingles with minerals from the underlying parent material (geology). This process gives rise to the rich tapestry of soils found across the world. The age of the soil organic matter contained within soil can vary dramatically. In fact, studies of carbon atoms locked up within it find some were fixed by photosynthesis in recent weeks, whereas others were fixed over 10,000 years ago. It is important to understand the age of the materials contained within the soil, as it influences organic matter cycles and soil processes. Both quality and quantity matter. There are three main pools of organic matter:

- Fresh plant residues (litter, decaying roots) and small living soil organisms
- Decomposing (active) organic matter
- Stable organic matter, often linked tightly to the clay minerals (sometimes called humus). Very stable materials include charcoal and coal fragments

Well-structured clay loam soil in an arable rotation with organic matter distributed throughout the topsoil. Image featured in AHDB's Measuring and management soil organic matter publication.

## WHAT DOES SOIL ORGANIC MATTER DO?

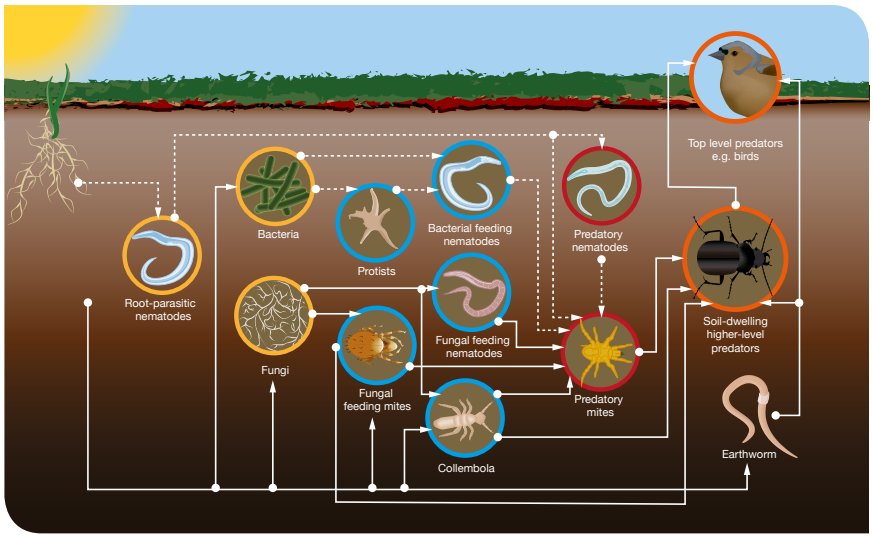
The nutrient values associated with organic materials are relatively well known and described within the AHDB Nutrient Management Guide. In addition to carbon, organic matter is also a source of nitrogen, phosphorus, sulphur, potassium, magnesium, calcium and micronutrients, such as copper and zinc.

Although hard to quantify, organic matter also plays a critical role in overall soil health. Fresh plant residues fuel soil life (see AHDB's soil food web). Decomposing organic matter influences the biological properties that affect nutrient cycling and soil structure. Stable organic matter adds significantly to the active surface area, changing the physical and chemical properties.

## ORGANIC MATTER LEVELS

The level of organic matter in the soil depends on the decomposition rate and how much is added. On the face of it, a simple equation in two parts. But, like most things, it is more complicated. Decomposition rate is affected by soil texture and the environment (e.g. soil moisture, temperature and aeration). Management practices affect both. For example, the disruption of soil aggregates during tillage usually increases rates of decomposition.

In terms of inputs, it's not just a question of how much is added but what is added and how often it is added. The amount of organic material applied to soil is usually given in t/ha, but it is essential to know how much water is present. Organic materials can range widely in their water content, from only 10% to 90%. The amount of carbon applied is closely related to the total dry matter application; each tonne of dry matter contains about 580 kg of carbon.




The soil food web: organic matter is a fuel for soil organisms. The coloured circles indicate various 'trophic levels' (lowest level on the left, highest on the right). Organisms in the lowest trophic levels are more likely to eat 'dead' organic matter.

## GREATSOILS

**This information is based on the AHDB Factsheet *'Measuring and managing soil organic matter'.* The publication was written by Elizabeth Stockdale, NIAB, as part of the AHDB–BBRO Soil Biology and Soil Health Partnership.**

**ahdb.org.uk/greatsoils**

Becoming fixated on achieving any particular level of soil organic matter may not be particularly helpful. Certainly, there is little consistent scientific evidence to suggest a critical threshold exists. Regular additions to 'feed' the soil are likely to be more important.

Although there are no thresholds, there are some good rules of thumb. For example, it is known that organic matter is naturally concentrated at the soil surface, unless inversion tillage takes place. It's also known that sandy soils hold less organic matter than a heavier soil. Consequently, a good level of organic matter for a sandy soil would be considered too low in a clay soil. It is important to take into account both soil texture and climate when assessing organic matter levels in soil.

## ARABLE EXPERIENCE

Patience is required when it comes to organic matter management. Research in arable systems shows benefits beyond nutrient supply can take longer than six years to be detectible. AHDB research suggests the nutrient value of any imported materials should be considered first. Once these have been taken into account, it is rarely economic to spend more than a further £30/t (dry matter) of organic materials added to soil per hectare (including the costs of material, haulage and spreading). Spring crops have been shown to have the highest direct yield benefits from improved organic matter management, especially in years with extreme weather – probably because these crops tend to establish better with stronger root systems.

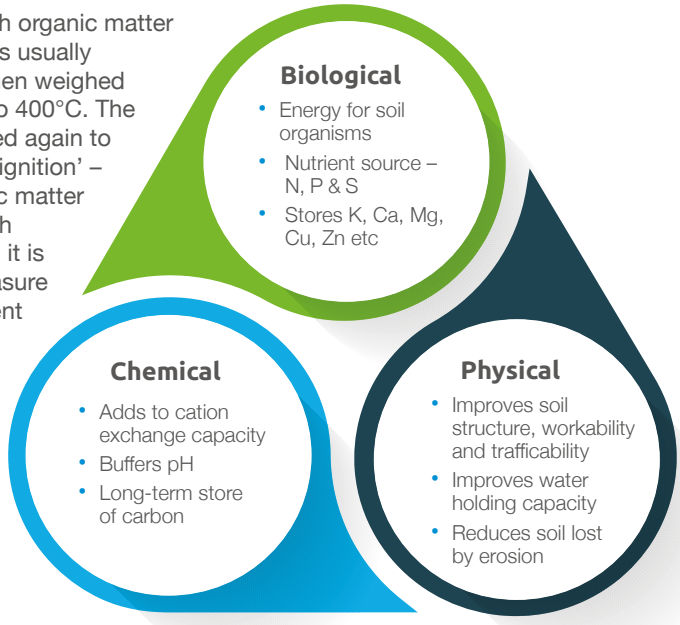
## SAMPLING AND MEASURING ORGANIC MATTER

The amount of organic matter in soil is relatively large compared with the changes that result from management over a short period of time, so it is not useful to measure it every year. In fact, most trends can usually be detected by sampling at intervals of three to five years (or longer). Samples should, however, be collected in the same way and, ideally, at the same point in the rotation. Several samples should be taken from across the field and mixed well – to make a 'representative' sample. Such samples are less prone to give odd results, due to the presence of roots or added organic materials (residues, manures, composts).

To calculate how much organic matter a sample contains, it is usually oven-dried (105°C), then weighed before being heated to 400°C. The sample is then weighed again to calculate the 'loss on ignition' – essentially, the organic matter is burnt off. In research laboratories, however, it is more common to measure the total carbon content of the soil (after removing any mineral carbonate) by dry combustion and elemental analysis. In this situation, the amount of carbon measured can be converted into an estimate of organic matter.

As different methods can produce different results from the same sample, the same method should be used to track field-level changes over time.

> **"The level of organic matter in the soil depends on the decomposition rate and how much is added. On the face of it, a simple equation in two parts. But, like most things, it is more complicated. Decomposition rate is affected by soil texture and the environment"**




The main roles of organic matter in the soil

## ORGANIC MATTER PUT TO THE TEST

Monitor farmers Christy and Hew Willett farm at Parklands Farm in Galleywood on the fringe of Chelmsford, Essex.

This mother-and-son team farm in partnership across 478 ha of arable cropping, with a mixture of owned and rented land.

The Willetts farm on loamy and clayey soils that are slowly permeable and seasonally wet, with impeded drainage. This can provide a management headache, especially during sustained spells of wet weather.

Their rotation is typically two wheats (most destined for local millers), followed by spring beans/oilseed rape. Since 2012, however, they've operated a more flexible rotation to respond to the condition of each field. Spring barley and spring oats help add to the rotation's diversity.

A significant challenge on the farm is grass-weed management, including black-grass and rye-grass. Another challenge on the farm is the overall condition of the soil, especially as their land has a low-carbon content. At the Monitor Farm's launch in 2017, Christy and Hew decided to focus on increasing the organic matter levels in their fields.

A 28 ha field was selected (following beans) and split into five areas, one for each of five treatments. The treatments were sewage sludge, turkey manure and green waste compost (all applied at 20 t/ha in September) and a control (no organic material applied). After these treatments were made, winter wheat was drilled (early October) with a strip-till system. The fifth treatment was a September-drilled grass ley (35 kg/ha). Prior to treatments being applied, soil physical and biology assessments were completed. All treatments were repeated last autumn.

Although it is too early for firm conclusions to be made, the ground is already providing clues that the treatments are having an effect. "There are definitely more worm casts in the grass and where there was manure applied, especially the turkey muck," explained Christy.

It is hoped that the combined effect of a diverse rotation, organic matter inputs and the recent adoption of low-disturbance tillage will lead to measurable differences in soil organic matter and structure. The soil will be re-sampled this autumn to see what the effects of the treatments have been.

**"We definitely want to increase soil organic matter as quickly as possible. Recent thinking is that this can be fast-tracked with cover crops and grazing"**

# ARABLE **CONNECTIONS**

This summer, AHDB's Arable Connections will feature at events throughout the UK, giving you the opportunity to discuss the latest practical trials and demonstrations with experts from across the cereals, oilseeds and potato industries.

The events will also focus on cropping options that add value in the supply chain and provide an opportunity to discuss the latest research developments relating to integrated pest management, soils and business resilience.

We have partnered with several leading organisations in the arable industry to bring Arable Connections to growers throughout the country:

- ADAS and AHDB Open Day – Hereford, Herefordshire 18 June
- NIAB TAG South Open Day – Sutton Scotney, Hampshire 18 June
- Morley Innovation Day – Morley, Norfolk 20 June
- Elsoms and AHDB Open Day – Spalding, Lincolnshire 25 June
- AFBI and AHDB Open Day – Belfast, Northern Ireland 25 June
- Groundswell – North Hertfordshire 26–27 June
- Pearce Seeds LLP and AHDB Open Day – Sturminster Newton, Dorset 27 June
- NIAB TAG Croft Open Day – Croft, County Durham 27 June
- Arable Scotland – Dundee 2 July
- Saaten Union and AHDB Open Day – Cowlinge, Suffolk 4 July
- Whole crop marketing day – Brough, East Yorkshire 31 July
- Potatoes in Practice – Dundee 8 August

**For more details and to book, visit ahdb.org.uk/events**

# QUALITY AND QUANTITY FOR THE BEST LOAF

**Alex Wilcox farms 250 ha of combinable crops with sugar beet at Stowbridge near King's Lynn and was this year's winner of the Yield Enhancement Network (YEN) milling wheat quality awards, with his 2018 harvest crop of Crusoe. The judges of the award said his wheat demonstrated great quality, good gluten rheology (how stretchy the dough is) and produced the best loaves with excellent colour, structure and texture.**

## ALEX'S WINNING CROP

We were really pleased with our crop this year. We aim for a market specification which is 76 kg/hl bushel weight, 250s Hagberg and 13% protein. This year we hit it really well.

For me, the key elements for growing quality milling wheat are a healthy, well-structured soil, achieved through organic matter applications and soil management. It involves attention to detail in agronomy, from seedbed conditions and nutrition through to fungicides.

Crusoe is our variety of choice because it usually gives us a better protein, although in a wet year it can suffer with losing its Hagberg more rapidly. As a risk management tool, we grow Zyatt on the other half of the farm, but we get slightly lower proteins but slightly higher yield and Hagbergs.

The entry for this year was Crusoe winter wheat, drilled at 350 seeds a metre in late October on silty clay loams. We drilled late due to black-grass on the farm.

We have a flexible cultivation system which does involve ploughing in certain years, though it's mainly non-inversion tillage. For the crop we entered, this year was the first time in five years it had been ploughed – with a 12-inch furrow reversible plough. We give a lot of attention to the skim setting and the forward speed, because of the black-grass. It actually ploughed really well and that allowed us to delay the drilling because it made the field weatherproof.

After ploughing, we worked it down with a disc harrow and then disc-drilled it.

Our treatments for the winning crop were our standard field treatments as per the rest of the crops:

- Nitrogen: 220 kg/ha (including liquid nitrate, 10 litres at T3)
- SO3: 60–70 kg/ha
- Phosphite: 0.8–1 L split between T0 and T1
- Magnesium, manganese and zinc: three to four applications, in nitrate formulation
- T0 and T1: triazoles, azoxystrobin, chlorothalonil, cyproconazole and propiconazole
- T2: SDHI, metconazole and epoxiconazole
- T3: tebuconazole/prothioconazole

In terms of costs, the overall total N applied is the same as a feed wheat, we just split the application timings and ratios. Our fixed costs are very low as we have no full-time labour on the farm and our machinery policy is very low-end. We reckon that the crop yielding 12.2 t/ha cost £86 per tonne to grow.

Last year was an easy harvest. Sometimes in the Fen, the crops do hang on and you're struggling to get started. But, as it was in 2018, the weather was hot and dry so harvest went very smoothly and we were really pleased with it.

The awards were announced at the 2019 Milling Wheat Conference, held in February. For more information about the YEN awards, and to find out how you can use benchmarking to analyse the financial implications of aiming for higher yields, speak to your local Knowledge Exchange Manager (see pages 32–39).

### FARM FACTS

**Farm: A&J Wilcox, Hill Farm**

**Soil type: silty clay loam**

**Rotation: oilseed rape, beans, sugar beet, winter wheat, spring malting barley**

**Winter wheat market: mills in Peterborough and Wellingborough**

**Winning crop (harvest 2018): Crusoe, 12.2 t/ha, 13.1% protein**

# ARE WE B-READY FOR **N RESTRICTIONS?**

**What happens to the baking process if there are restrictions on nitrogen use in the field? Does the end user have any responsibility for lowering the protein spec from 13%? What will happen to the nitrogen/protein relationship going forward?**

Essex farmer David Lord put these questions to a board of millers at the Milling Wheat Conference earlier this year. Here's what the millers said:

**Miller 1**

"We have to be pragmatic and find ways to work around it, if it does happen. We'd work with processors to help them develop their processes to create a product of the required quality."

**Miller 2**

"It all depends on the product we're making. UK bread stands tall, French bread is shorter and Moroccan flatbreads are flat. But if, as is happening in Germany, N restrictions are coming into play on their key wheat they're growing from this year onwards, there will just have to be other ways that they do it. Some bakers get away with having lower-protein UK wheat because they're using a lot of higher-protein Canadian spring wheat. So there are other ways of working with it."

**Miller 3**

"You need strong flour to hold up multigrain seeds, malted wheats and cracked wheat, etc., otherwise it would just sink to the bottom. There will be ways round it!"

**For fertiliser management guidelines, go to ahdb.org.uk/rb209 Also, see the Recommended Lists for information on milling wheat varieties. The variety comments highlight where nitrogen applications may need to be adjusted to achieve protein specifications.**

# MARKET INTELLIGENCE FOR YOUR FARM BUSINESS

**David Eudall, Head of Market Specialists (Arable) david.eudall@ahdb.org.uk**
**0247 647 8873, 07823 789 910**

## WHAT WE'RE TRYING TO ACHIEVE

**Over the last decade, we have seen continuous change across domestic and international markets. Weather continues to have a sizeable impact on the longer-term direction of all markets. As we see conditions becoming more volatile from year to year, the price reaction continues to create unstable markets.**

This is not going to change and we are now feeling the impact of external factors, whether these are political or speculative in nature.

Combining this with the changing face of domestic supply and demand, we know that each and every season will see vastly different marketing conditions. At AHDB, we need to ensure that the information we provide is relevant, up to date and, most importantly, useful to all our levy payers.

For the Market Intelligence team, this means responsive, insightful analysis of domestic and global market drivers. We need to ensure that our impartial analysis matches your information requirements. To guarantee this, we're going to be making some changes.

The Market Intelligence department has a team of Market Specialists whose role is to clear the fog of global and domestic market information. The aim is to give a clear and impartial view of the market. We do not hold any bias or have a commercial aim. Our job is to offer an independent view of what is affecting the prices of domestic grains and oilseeds.

## IMPROVING INFORMATION

We have to change and adapt to meet levy payers' needs. In 2019, you will start to see a difference in the look and content of the Cereals & Oilseeds Market Intelligence reports. We'll be moving to a new style of email which will give an improved structure and content. This will allow us to clearly pass on the key pieces of market information that you require.

Through the summer, the look and feel of the Weekly Market Report and Grain Market Daily will change. The new format is far easier on the eye, easier to use across a range of devices and still provides valuable insight and analysis to help formulate business decisions.

While the style and format is changing, so too is the content. We now operate in a market where uncertainty and conjecture have a greater sway upon market direction than the 'classic' fundamentals of weather, supply and demand. Our new outputs will be giving our analysts an opportunity to extend their own opinions and ideas on the grain markets.

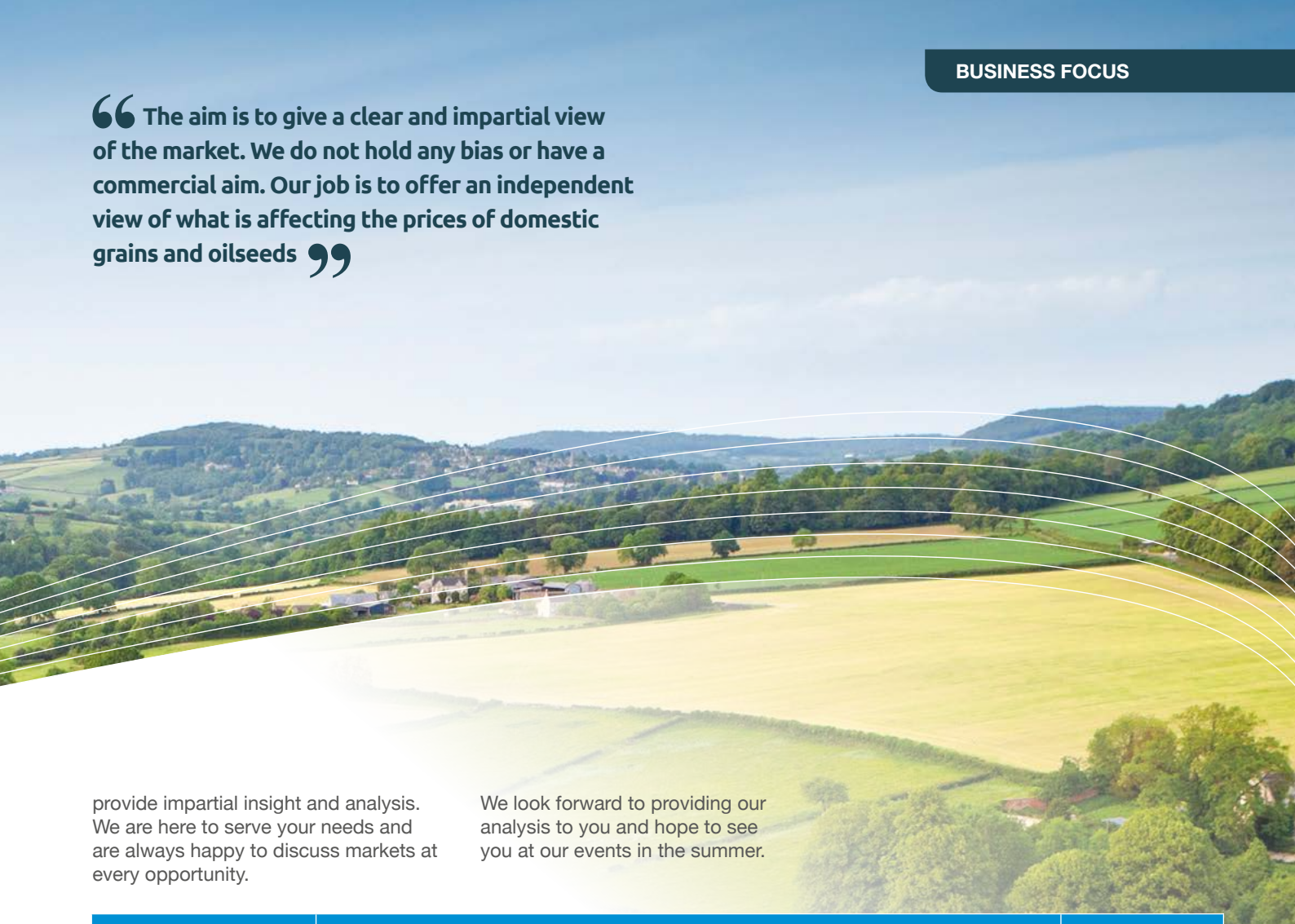
From our impartial and independent viewpoint, we can analyse what really matters and highlight what can be ignored. This will help to clarify market news to show what the true trends are for our markets.

## WHAT'S COMING?

Over the coming months, your Market Intelligence team will be producing a range of reports and events to keep you informed. Our aim is to be active in the industry and get involved with all types of activities across the supply chain. From getting out in the field in our July Crop Tour, to presenting our insight at the Grain Market Outlook conference, we are available and open to talk.

More importantly, if you have a question or are looking for data, then contact us! The AHDB Market Intelligence department is the largest dedicated analyst resource looking specifically at domestic agricultural markets. We have the best contacts and information available to anyone in the industry. With no commercial bias, we will always

**“The aim is to give a clear and impartial view of the market. We do not hold any bias or have a commercial aim. Our job is to offer an independent view of what is affecting the prices of domestic grains and oilseeds”**



provide impartial insight and analysis. We are here to serve your needs and are always happy to discuss markets at every opportunity.

We look forward to providing our analysis to you and hope to see you at our events in the summer.

| Publication/Event | Information | Date |
|---|---|---|
| Planting & Variety Survey | We start the summer answering the key question: how much crop can we expect from this year’s harvest? For this we need to know what is in the ground and our Planting & Variety survey is the best place to start! | Early July |
| Summer 2019 Crop Tour | The team will get boots on the ground and give a detailed view of crop conditions and market expectations as we move towards harvest. | Mid-July |
| Crop Condition & Harvest Updates | We will continue our partnership with ADAS to bring you updates on harvest progress and estimates of UK yields for all main crops. | July–September |
| Cereal Quality Survey | The Cereal Quality Survey will this year be updated live as data comes in so you can see how the quality of the crop is changing and make marketing decisions based on this. | August–September |
| UK Balance Sheet Updates | We will be producing our end-of-season balance sheet for 2018/19 in September. Following this release, we will publish the 2019/20 balance sheet in October, which will be keenly awaited to see the move to a possible exportable surplus. | September–October |
| Grain Market Outlook Conference | Your Market Intelligence team will be providing a full morning of analysis and insight into what lies ahead for the 2019/20 marketing season. | Tuesday 16 October 2019 |

FOOD
a fact of life

FREE resources

Free resources for teaching young people aged 3–16 about where their food comes from, cooking and healthy eating.

Visit the updated website for:

- Lessons, worksheets, cards, presentations, posters, videos and quizzes
- Resources organised by age
- Recipes tried and tested for use in schools
- Training, online and face-to-face

Food: a fact of life is managed by the British Nutrition Foundation (BNF), in partnership with the Agriculture & Horticulture Development Board (AHDB).

foodafactoflife.org.uk

# HOME BAKING

Grace Randall, AHDB Consumer Insight Analyst

**We spend £1.6bn a year on home baking in the UK, but it's a category in decline, says research by Kantar Worldpanel. The potential market for pre-packed flour and butter is large, and the key to promoting the market is to remind people why they love and enjoy baking.**

## BAKING MARKET OVERVIEW

Scratch cooking has seen strong recovery over the past two years, but home baking is not seeing this positive performance, with a continued decline for over 10 years. In the last year alone, there have been 49 million fewer baking occasions – down 4% on the previous year, according to Kantar Worldpanel. The 'Great British Bake Off' effect has slowed. According to the BBC, the hugely popular show hit viewing figures of 14 million in the 2016 final, but this has nearly halved to an average 7.5 million in 2018.

People tend to spend more time at home in uncertain economic times and this, in theory, provides an ideal climate for home baking to thrive.

Pre-packed flour sales volumes are flat and a decline in price has seen spend drop slightly. Self-raising flour is the largest contributor to the decline, with volumes down 3%. However, bread flour and plain flour have seen volume increases of 2% for the year ending 27 January 2019, compared with the previous year (ending 28 January 2018).

> **"People tend to spend more time at home in uncertain economic times"**

Butter prices have increased drastically over the last year, leading to the overall market value increasing by nearly 7%. However, as a result, volumes sold have declined by 3% over the last year, compared with the previous year, as people drop out of the category and turn to cheaper alternatives (Kantar Worldpanel).

## HOW CAN WE PROMOTE BAKING?

The baking market is losing momentum. For many, baking is seen as time-consuming, messy and unhealthy, which goes against many of the consumer trends we are seeing.

However, baking can still appeal to people if we remind them of how it can fit in with their needs. The industry could use simpler recipe inspirations to fit in with people's need for ease. The Minimalist Baker on Instagram is a good example of this – all the recipes posted either have fewer than 10 ingredients, only use one bowl or take under 30 minutes to make.

Innovations can play on the ease trends, for example, ready-to-bake mixes and 'Bake in the box' cakes.

Despite ease being important, though, there's still a place for 'showstopping' cakes, especially on social media, which provides an opportunity to support and teach more advanced bakers.

## HEALTHY BAKES

Home baking has the opportunity to appeal to the health-conscious consumer, so products with health benefits should be a focus for promotion, for example using alternatives such as oats, superfoods and natural sugars.

Consumers spend slightly more on savoury baking than sweet, at 57% of the home-baking market in 2018, according to Kantar Worldpanel. Although there's a definite concern in 85% of UK households about high levels of sugar in foods, the primary drivers for healthy food are the benefits, such as being more natural or including portions of fruit or veg, rather than cutting down on sugar content.

Shoppers will also pay a 9% premium for products they view as healthy (Kantar Worldpanel).

So, promoting home baking as a way to eat more naturally could give people the permission to make their cake and eat it and give the industry the boost it needs.

# GUIDANCE AND CONFIDENCE FROM BENCHMARKING

**Gavin Hunter, Tillbrook Farm**

**I've been farming here near Huntingdon all my life. We're mainly arable – just over 400 ha arable cropping, 80 ha grass, which is all fed to pedigree Devon cattle**

We've been benchmarking for three years now and that gives us a comparison with our neighbours on how we're doing. It's the differences – it's not a case of who is at the top and bottom, but it's seeing where the variations are between the farmers.

Farmbench is a lot easier to use now than it was two or three years ago. Once you've got those gross margins in, I think I put all my figures in in about an hour. It's not a big job. Once you've got those figures in, it's easy to operate and literally the information comes straight back. It's all under one umbrella now, which makes it so much easier. It's all come together now and the whole package is there. You can do your crops and then the livestock all follow on as well. It's a good package and worth working with.

You've got to use something like Farmbench, see where you're going, get your costings and adapt and change.

Since we've started benchmarking we've started growing spring barley. And as a result of that we've phased out winter barley, so this year is the first time in 40 years that we've got no winter barley. We've had the confidence to do that move now and I'm quite happy with that change.

Without the benchmarking, I don't think we would have done that.

With Farmbench, you can see your strengths and your weaknesses and it's giving you guidance and confidence to carry on and make changes if you want to when you've seen all the figures.

**ahdb.org.uk/farmbench**

# FAMILY FARM, **WHOLE-FARM FOCUS**

**The seven new Monitor Farm hosts appointed in England this year bring a fresh, whole-farm approach to the scheme.**

All seven farms have multiple enterprises, including cereals and oilseeds, and all but one have livestock within the business.

The farms – all of them family farms – range in size from 190 to 765 ha, representing a range of soil types and cultivation methods.

Richard Meredith, AHDB Senior Knowledge Exchange Manager said: "It's really important to look at the farm as a whole – especially at how the enterprises interact and benefit each other. In our technical discussions we'll be focusing on the arable side of the businesses, but, where possible, we'll look into challenges that apply to farmers from a number of sectors."

The seven new Monitor Farm hosts are:

- Rory Lay, Park Farm, Loppington, Shropshire
- Ashley Jones, Smeaton Farm, Saltash, Cornwall
- Bill Web, Manor Farm, Hale Village, Cheshire
- Richard Ling, Rookery Farm, Diss, Norfolk
- Gary Shipley, Huggate Wold Farms, Huggate, Yorkshire
- James and Michael Parker, Sherwood Farms, Vale of Belvoir, Leicestershire
- William Smith, Beaute Farm, Canterbury, Kent

Over the next three years, the new Monitor Farms will host meetings for local farmers and others in the industry, discussing hot topics of the day, hearing from experts, sharing and comparing ideas to improve their businesses.

Ashley Jones, who will be hosting the Saltash Monitor Farm, said: "I wanted to become a Monitor Farm host because I've found the experience at other Monitor Farms very enjoyable. I've learnt something new every meeting and I like to be able to get into discussions with other people in the trade and fellow farmers.

"I also feel that every day is a school day and there is always something to learn, so what's better than getting involved and having a group of farmers on my farm suggesting ideas and sharing their experiences?"

Although unified by their shared interest in learning and improving, the seven new host businesses bring a wide range of experiences and interests, from biodiversity to localism, work–life balance and resilience.

**For more information and meeting dates, visit cereals.ahdb.org.uk/monitorfarms**

# MEET THE **NEW** MONITOR FARMS

## LOPPINGTON MONITOR FARM

**Rory Lay runs a 457 ha mixed family farm with cereals, sheep and beef.** The arable rotation is based around the livestock, so includes a lot of turnips, fodder beet and maize. Rory recently converted the arable business to strip tilling, which he says has given him huge cost savings, as well as improving the soil conditions. During the three years of the Monitor Farm programme, he'd like to look in more detail at costs and benchmarking; health and safety on farm; soil health; and assessing the farm as a whole – livestock and arable together.

## HALE VILLAGE MONITOR FARM

**Bill Webb farms with his son at Manor Farm in Hale Village, on the Mersey estuary.** They grow potatoes, spring barley, winter barley, oilseed rape and wheat at the 417 ha farm, on a range of light to medium-heavy land. All but the barley is sold to customers within 20 miles of the farm – localism and strong links with the supply chain are key philosophies of the business. Rye-grass is the primary weed challenge at Manor Farm. Bill wants to keep learning and improving his farm, as well as bringing more locally relevant research and knowledge to the North West.

## SALTASH MONITOR FARM

**Ashley Jones runs the mixed 190 ha Smeaton Farm, which is part of the Duchy of Cornwall estate.** In partnership with his family, he farms 100 ha cereals, with maize and potatoes in the rotation, and has 200 head of beef and 200 ewes. Diversification activities on the farm include a bed and breakfast, maize maze, Christmas trees and agricultural contracting. During the three years of the Monitor Farm programme, Ashley wants to try new ideas, experiment and learn from others in the industry.

## **DISS** MONITOR FARM

**Richard Ling farms 400 ha on varied soil types from sandy loam to heavy clay loams.** His arable rotation, on 380 ha, includes wheat, oilseed rape, winter barley for feed or spring malting barley. The farm employs one full-time member of staff and casual labour when required. Richard mainly operates a min-till system but assesses each field based on soil health. The farm also has a beef finishing unit for Morrisons, aiming to finish 150 British Blues per year, business and residential lets and a self-storage business.

## **HUGGATE** MONITOR FARM

**At his 657 ha, high-altitude family farm on the top of the Yorkshire Wolds, Gary Shipley grows winter wheat for feed, winter malting barley, oilseed rape/ spring barley, vining peas for Birds Eye and potatoes, using a plough-based system.** He is starting to investigate using cover crops in the rotation for soil benefits and sustainable farming. Soils are calcareous silty loam soils stretching to heavier clay loam. As well as arable cropping, the farm also has 150 gimmer lambs on rough grazing in the dales and a relatively young suckler herd. Gary wants to grow and improve the business while reducing his impact on the environment.

## **VALE OF BELVOIR** MONITOR FARM

**Father-and-son team James and Michael Parker farm a flexible rotation on soil ranging from heavy clay to clay and sandy loam.** Their 560 ha arable cropping includes winter wheat, winter oilseed rape, winter barley, spring barley, winter beans, winter triticale and spring linseed. Sherwood Farms is also home to 72,000 laying chickens, a mixture of free range and colony. The eggs are packed and sold on site. Both James and Michael are looking forward to comparing their business with other farmers facing similar challenges, identifying where improvements can be made.

## **CANTERBURY** MONITOR FARM

**William Smith farms with his father, brother and one other employee at Beaute Farm near Canterbury, covering some 765 ha, of which 190 ha are owned, 100 ha are rented and the rest managed under contract-farming agreements.** Soil types include chalk loam, brick earth and marsh clay. William grows milling wheat, oilseed rape, beans, quinoa and maize for a local anaerobic digestion plant. The farm also has a sheep and beef enterprise, straw and hay and property-development businesses. William wants to improve his net margins through reducing input costs, via an integrated farm and pest management approach, reducing his impact on the environment and supporting local biodiversity.

**For more information about Monitor Farms**
**cereals.ahdb.org.uk/monitorfarms**

**For more information on Farmbench**
**ahdb.org.uk/farmbench**

# ARE YOU SPENDING **TOO MUCH** MONEY ON YOUR MACHINERY?

**Tom Hebbert, AHDB Communications Executive**

**Over the last season, several AHDB monitor farmers undertook a review of their farm machinery to see how they could save costs by better understanding their equipment spend.**

An investigation led by Knowledge Exchange Manager Harry Henderson found that growers were spending too much on their machinery, which on average accounted for 25–30% of the farm's wheat growing cost.

With Britain's impending departure from the European Union expected to bring about big changes in agricultural payments, the pressure on farms to streamline costs is considerable. By undertaking a review of what is a major component of a farm's operational spend, growers were able to identify where they could make savings.

Twenty-two monitor farmers undertook an in-depth analysis of their machinery operational costs, taking into account tractors, implements and other equipment such as sprayers and harvesters. The review looked at purchase price, number of years of ownership, estimated value at sale and depreciation, as well as running costs such as fuel and labour.

While the sample is not big enough to draw firm conclusions, there were some common themes from the reviews carried out across AHDB's Monitor Farm network. The farms with the lowest 25% of costs had:

- Depreciation below £63/ha
- Low repair costs through tactical hiring and experience
- Diesel use below 100 L/ha
- Farm size 500–1,000 ha

Harry said: "While the review showed that many farmers can stand to reduce their machinery expenditure, the correct strategy isn't about spending as little as possible: this could mean exposing your business to possible machinery breakdowns."

With every farm different, Harry said that it wasn't possible to apply a set of hard and fast rules, but by having a grasp of what the equipment is costing the farm, it is possible to weigh the potential benefits of contractors and analyse timelines, allowing a manager to adjust their system accordingly.

As a first step, Harry recommended looking at tractors and other machinery, particularly if they're being used for non-essential work. Keeping a piece of equipment on farm over a longer period could dramatically reduce its running cost per hour.

"Trade-in values will be lower, but the cost of keeping machinery for longer is still lower than early replacement. In the longer term, a planned replacement policy, a review of the whole system and appropriate machinery care responsibilities placed with the operator are all important factors. Work with your dealer and remember that a special deal is unlikely to be the last: trade in when you are ready."

Harry also said that farmers should consider using Farmbench to help assess machinery and business costs. The online tool enables farmers to manage resilience to risks and to cope with volatility. It is free to levy payers and allows farmers to analyse their cost structure and make comparisons with others.

One further benefit of staying on top of machinery costs could also be an improved work–life balance. Robert Cross, AHDB's Warrington's Monitor Farm host, said that having a better understanding of his equipment spend could enable him to reduce the amount of time he's out in the field.

"Having a sprayer with a little bit of extra capacity, where it's not ridiculous in terms of costs but where I'm able to then choose the times I go out or take an hour out in the evening to spend time with my family over a meal, is important to me."

# **ALGERIA**, BISCUITS AND CONFIDENCE

**Algeria, nestled on the north coast of Africa between Morocco, Tunisia and Libya, has a varied and colourful cuisine, reflecting the country's exchanges with other countries throughout its history. With a growing taste for wheat biscuits, and their government drive to improve domestic food production and reduce reliance on a small number of foreign importers, there's an opportunity for UK growers of uks wheat.**

There's little cultivable land in Algeria and none of it is suitable for growing biscuit-grade wheat. So all of its 2–2.5 Mt/year requirement of biscuit wheat, or the biscuits themselves, must be imported.*

OAIC, responsible for all of Algeria's wheat import requirements, wants to strengthen its position, reducing its reliance on France and Turkey for wheat and biscuit imports respectively.

To help them along the way, AHDB hosted a delegation of state cereals officials during a special visit to the UK in March, for them to look at opportunities for importing UK biscuit wheat (**uks**). The Algerian buyers visited a farm, grain store and port to understand UK wheat production, storage and the current assurance schemes.

Grain exporter Martin Perry from Bartholomews, who helped host the Algerian visitors at Shoreham Port, said: "With all end consumers, it is always better to meet buyers in person to fully understand their requirements. It was important for the UK to demonstrate that we have modern export facilities with high levels of cleaning and segregation and also that our grain is fully traceable from assured farms that have a good understanding of modern farming practices with an appreciation of sustainable, environmentally-friendly agriculture."

The UK's existing trade relationship with Morocco to supply uks wheat definitely helps our case, building confidence with OAIC and Algerian biscuit millers.

Next steps would include consultation between OAIC and biscuit millers, agreeing a suitable specification for biscuit wheat which would then enable OAIC to import biscuit wheat via international tender and supply biscuit mills at subsidy prices – as is the case with bread wheat.

Given the current situation, the potential for UK biscuit wheat exports to Algeria looks promising and maintaining contact with buyers in Algeria is key to ensuring future opportunities for UK biscuit wheat exports.

*USDA

Opposite image: Shoreham port

> There's little cultivable land in Algeria and none of it is suitable for growing biscuit-grade wheat. So all of its 2–2.5 Mt/year requirement of biscuit wheat, or the biscuits themselves, must be imported

# BARLEY AND BROME: **ARE WE BACK TO BUSINESS WITH CHINA?**

**In the Autumn/Winter 2018 edition of Grain Outlook, we reported on how China's strict grain hygiene rules were holding back barley trade**

The barley protocol, which was negotiated by AHDB in 2015 to allow the UK to export barley to China, is now being reviewed. In order to see just how big the brome problem is, 300 samples of barley are being surveyed for weed contaminants. Full results are expected in November, with a view to determine what levels of weed seed are justifiable and under what justification, as agreed by Defra and the UK trade community. This will then be presented to the Chinese plant health authorities (GACC).

Discussions with both the UK Department for International Trade in Beijing and Chinese companies revealed that the presence of sterile brome in potential shipments of UK barley to China is not as much of an issue as perceived by UK exporters.

Although a tolerance for the weed in grain shipments would not provide immunity altogether against inspection, the Chinese authorities and inspectorate do appear to take a pragmatic view of cereal imports. They do not necessarily inspect to tolerance stated in the legislation, provided the cereal samples appear healthy by visual inspection, with no major contaminants.

France successfully exports volumes of cereals to China, despite the zero tolerance for sterile brome and other weeds, as stated in their export protocols.

Cereals from the UK are of great interest to Chinese companies looking for alternatives to grain from the USA, Canada and Australia, and there is certainly a willingness to trade with the UK.

At the end of last year, China launched its first ever anti-dumping investigation against its main barley supplier, Australia, targeting barley exports. The investigation process into dumping, a practice where a producer sells a product to an export market at a lower price than it sells at home, is expected to last a year. In the meantime, no barley trade can take place between China and Australia.

Furthermore, the current trade dispute between the USA and China has created uncertainty over future supplies of wheat and barley to China. With China not currently importing any Australian or US grain, this has created opportunities for UK cereal exports to China.

Regardless of revisions to the existing export protocol between the UK and China, which could take some time, UK companies could begin to export small volumes of barley to China as a trial, to start exploiting this potentially great market.

**“Cereals from the UK are of great interest to Chinese companies looking for alternatives to grain from the USA, Canada and Australia, and there is certainly a willingness to trade with the UK”**

## **REAPING REWARDS:** IN YOUR AREA

# North West and Northern Ireland

**Michelle Nuttall, Knowledge Exchange Manager**
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## BENCHMARKING TOGETHER

Iain McMordie is part of the Downpatrick Monitor Farm Steering Group and is in a farming partnership with his neighbour John Gill. In 2006, both neighbours found themselves largely farming alone and short of labour, so they decided to share resources.

Their business started as a haylage company and then in 2012 they took on a shared farm opportunity. This increased their joint farming area from 80 ha to 223 ha, with 32 ha of haylage.

Iain's previous role as a mechanisation adviser meant he has always valued the importance of knowing full costs, including depreciation, repairs and interest. Having an understanding of their cost of production per bale of haylage was valuable in allowing them to know costs and to ensure a profit margin. Last year, the duo started benchmarking their business using Farmbench. They said: "It's started the process of being able to compare and evaluate our costs compared with others."

Everything is bought and sold through their haylage business, which means it's easy for them to benchmark their costs as a whole.

As a result of analysing their costs as a single business, they have rationalised their machinery use, reducing from two or three tractors each to three shared tractors. They have scaled machinery up to cope with the additional land, moving from individual 10 ft combines to one 25 ft machine. They have also been able to install a floor dryer to the grain store for winter barley, which has reduced their labour requirement, freeing up more time for stubble cultivations, straw harrowing and preparing for autumn sowing.

Iain has also found personal value from joining with John. He said: "I think being part of a partnership has made us more resilient for the future – we both have ideas and then discuss what is sensible."

Having another head in the business has meant Iain and John can bounce ideas off each other, have more support in trying new things and strategically make changes across the business.

Being part of the Downpatrick Monitor Farm will also offer more opportunities for the pair to discuss innovation on farm, as well as to continue to compare their costs against other farms in the area.

## DATES FOR YOUR DIARY

**Monitor Farm meetings:**

- **Warrington: 5 June 2019**
- **Downpatrick: 18 June 2019**
- **Hale Village: 20 June 2019**

**ahdb.org.uk/events**

## REAPING REWARDS: IN YOUR AREA

# North East

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## NEW CONTACT FOR GROWERS IN THE NORTH EAST

New recruit Rose Riby has joined AHDB's arable Knowledge Exchange team and will work across the County Durham, Northumberland and Yorkshire region.

She's already familiar with the area, having previously worked for plant breeder KWS UK in regional sales, covering the North and Scotland.

In that role, Rose provided regional growing advice to merchants, agronomists and farmers on key varieties. The job enabled her to develop an interest in different crop varieties, particularly wheat, barley, oilseed rape and hybrid rye.

A farmer's daughter from the east coast of Yorkshire, Rose is aiming to be fully BASIS-qualified, having already completed her BASIS Foundation Award in Agronomy, as well as achieving her BASIS Certificate in Crop Protection IPM (Seed Sellers).

Having joined AHDB's recently expanded Arable Knowledge Exchange team, Rose is looking forward to broadening her knowledge, meeting new faces and working with growers to help them build resilient businesses.

She said: "It's an exciting time to be joining AHDB: there are plenty of challenges facing growers on the horizon and I'm looking forward to using my new role to support the industry towards a healthy future.

"My time at KWS means that I'm used to travelling around and speaking with growers in my region. My specialist areas range from supporting on-farm objectives, identifying key markets and knowing how to get the best out of crops."

AHDB Knowledge Exchange provides the first point of contact to growers and others involved in the industry looking to access services funded by the levy.

The new Arable Knowledge Exchange team, which consists of 22 Knowledge Exchange and Knowledge Transfer professionals, provides a more coordinated and effective offer to the arable sector through joined-up events, resources, campaigns and stakeholder engagement. The team will also provide expertise on areas common to potatoes and cereals and oilseeds, such as: soils, rotations, benchmarking and integrated pest management.

Rose joins the cereals and oilseeds side of the team and will run key initiatives, such as the Monitor Farm programme, as well as AHDB events in the North East region.

## DATES FOR YOUR DIARY

**Monitor Farm meetings:**

- **Saltburn: 6 June 2019**
- **Huggate: 2 July 2019**

**ahdb.org.uk/events**

## REAPING REWARDS: IN YOUR AREA

# West and Wales

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## CULTIVATING A POSITIVE FUTURE

In February, the Hereford Monitor Farm group, with hosts Martin Williams and Russell Price, met with local MP, Jesse Norman, to discuss how to keep Herefordshire farming a success in the future. Education, innovation and recognising both the environment and reliability of food production topped the list.

### EDUCATION

The value of education couldn't be underestimated, both for new entrants to the industry and to the public. Russell said: "It's important that people coming into agriculture see it as an exciting career choice."

For people considering farming as a career, it's important to communicate the benefits of working in agriculture, as well as provide training and development opportunities. The image of farming, according to the group, is vital.

Business support for agricultural apprenticeships was also seen to be a positive move. "The industry's future is in their hands," said Russell.

### INNOVATION AND PRODUCTIVITY

Farmers are already achieving more than ever from the land available, but innovation will be the key to maintaining supply for a growing population. The group felt that policy supporting innovation in agriculture would allow for businesses to be more productive and better placed to compete with the leading producers of the world. Martin reiterated the group's feelings: "A forward-thinking framework would allow us to compete on a level playing field with the rest of the world."

### FOOD PRODUCTION AND THE ENVIRONMENT

As well as the importance of ensuring a sustainable, healthy environment, the group would like to see food production recognised in policy going forward. Martin said: "It's the balance between producing enough good food for people and making sure we don't harm the environment in doing so." The group felt that one should not be a pay-off against the other.

## DATES FOR YOUR DIARY

**Monitor Farm meetings:**

- **Loppington: 6 June 2019**
- **Pembrokeshire: 19 June 2019**

**Strategic Farm meetings**

- **Strategic Cereals Farm West: 5 June 2019**

**ahdb.org.uk/events**

### CHAMPION BRITISH AGRICULTURE

Those who attended felt that more could be done to champion British farming, both in what it produces and the environment it protects. Russell said: "We are proud of what we achieve on both fronts and we believe that we have a point of difference from the rest of the world: we also provide a recreational space and a beautiful vista for the public on their doorstep."

**REAPING REWARDS:** IN YOUR AREA

# South West

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## CHLOROTHALONIL – END OF AN ERA

With the recent European ruling, it seems that 2020 will be the last opportunity to use chlorothalonil, which has been a stalwart of crop protection programmes for decades. The impact of this will be felt as much as anywhere in the arable fields of the South West where disease pressure is high. Not only has it been useful in its own right as a multi-site active, it has played a crucial role in protecting other active ingredients in crop protection.

Future strategies were discussed earlier this spring at a farm walk hosted by Mike Hambly at Callington in Cornwall with the AHDB Truro and Lynher benchmarking groups. With no current alternatives to chlorothalonil for ramularia control in barley, Mike focused his discussions on disease control in wheat.

Reviewing current practice in a crop of Graham wheat, Mike explained his T0, 1, 1.5, 2 and 3 programme traditionally included up to 4 litres of chlorothalonil with other actives. He has already started to think ahead, growing one 2019 crop without chlorothalonil and instead using a T0 epoxiconozole at 0.75 L/ha. Other actives that could be incorporated as alternatives are Folpet and Mancozeb. While effective, the impact will be felt on costs of production.

The benchmarking group are challenging themselves to grow wheat for £100/t (before rent and finance). Reviewing the 2018 harvest figures, the group are looking to shave off £23/t on average to achieve this. However, it was calculated that the move to chlorothalonil alternatives could nearly double the cost of that option, equivalent to £20/ha extra or £2.50/t on an 8 t/ha crop.

Like many other farmers around the country, Mike is keeping an eye on new chemistry coming over the horizon.

As well as this, Mike is also looking to make the most of new variety disease-resistance traits, considering Extase as an alternative to Graham. New to the most recent edition of the AHDB Recommended Lists, KWS Extase has the highest ever septoria rating at 8.1. Biostimulants offer another 'tool in the box' and Mike has plans to test these.

In conclusion, nothing is impossible, and there will be future effective (integrated) disease control strategies but they will need careful costing to keep costs of production down. This alone will not be the sole factor of profitable crop production – it will be a whole-farm approach through the benchmarking process, looking at all aspects of cost, both variable and fixed.

## DATES FOR YOUR DIARY

**Monitor Farm meetings:**

- **Saltash: 10 June 2019**
- **Truro: 19 June 2019**
- **Malmesbury: 25 June 2019**
- **Blandford: 3 July 2019**
- **Taunton: 9 July 2019**

**ahdb.org.uk/events**

## REAPING REWARDS: IN YOUR AREA

# South East

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## BIOSTIMULATING DISCUSSION

Following a thought-provoking Monitor Farm meeting, Mark Chandler, Petworth Monitor Farm host, was left wanting to know more about biostimulants – are they a good investment?

This year, Mark is trying biostimulants on a range of different soils, to see if there is a benefit. He has a lot of variation in soil type; for example, one 6 ha field has heavy silty clay at the bottom and light sandy loam at the top. To see how the product performs, his tramline try-outs are running at 90 degrees across the different soil types.

The demonstration is running on four adjacent fields with an amino acid biostimulant product applied at T0, T1 and T2. The product has been mixed with a fungicide and applied to one half of the field, while the other half of the field has been left as a control, with just the farm-standard fungicide applied. All other management decisions will be the same across the farm to really see what effect the product is having.

Growing crops across a field with different soil means that yield can be patchy, depending on the weather. Although Mark's fields don't have any nutrient deficiencies, he feels that biostimulants could help lessen yield loss as a result of plant stress. "I'm fairly convinced there will be a need for biostimulants on certain areas of the farm, but I need to identify where to put it," he said. "I'd expect to see a benefit on lighter soil in a dry year and on heavy soil in a wet year."

Mark has already carried out soil assessments and electroconductivity mapping, which means he has a good understanding of the soil. He will be using weather data to see if there's a link between how the product performs and any soil moisture-plant stress links.

He will use the weighbridge to record the differences in yields between the product-added versus the control fields. To really test out the results, Mark may look to repeat the try-out next year, in his final year of being a Monitor Farm host.

**To follow the journey, visit cereals.ahdb.org.uk/petworth**

## DATES FOR YOUR DIARY

**Monitor Farm meetings:**

- **Basingstoke: 4 June 2019**
- **Petworth: 6 June 2019**
- **Sittingbourne: 20 June 2019**
- **Canterbury: 3 July 2019**

ahdb.org.uk/events

## REAPING REWARDS: IN YOUR AREA

# East Anglia

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## TRAMLINE FUNGICIDE TRIALS

Historically, varieties with good disease resistance in wheat came with a yield penalty, but breeders have managed to close this gap and produce resistant varieties with little or no yield pay-off. Growing a variety with disease resistance has the potential to lower fungicide spend, but what is the cost of production for these varieties? Brian Barker, host of the Strategic Farm East, is trying to find out.

The tramline trial will compare the performance of KWS Silverstone, KWS Santiago, KWS Siskin, Graham and Shabras under three different fungicide programmes: high, moderate and low input.

Each variety is monitored throughout the season for disease symptoms on the leaf, stem and ear. As well as these check-ups, crop development is also being monitored with monthly plant counts and growth stage recordings. Once the trial has been completed, a full economic analysis will be done to see how the numbers stack up.

By understanding which variety grows best on his farm, Brian will be able to integrate varietal resistance into his disease management strategies. Incorporating different methods of crop protection, including genetics, forecasting tools and crop walking and monitoring, can help maintain the longevity of actives which are rapidly becoming at risk.

More information on decision support tools and crop monitoring can be found at **cereals.ahdb.org.uk/tools**

To follow Brian's journey on the Strategic Farm East and to see annual trial results, visit **ahdb.org.uk/farm-excellence**

## DATES FOR YOUR DIARY

### Monitor Farm meetings:

- **Duxford: 7 June 2019**
- **Chelmsford: 21 June 2019**
- **Diss: 25 June 2019**

### Strategic Farm meetings

- **Strategic Cereals Farm East: 6 June 2019**

**ahdb.org.uk/events**

## REAPING REWARDS: IN YOUR AREA

# East Midlands

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## SPREAD THE COST, SPREAD THE RISK

Brigg Monitor Farm host Colin Chappell has saved £12 per hectare by reviewing his business costs.

Colin has a keen eye for detail and is driven to make his business resilient and fit for the future. He looks to the specifics throughout his whole business, both environmentally and economically, to make sure his business is as efficient as it can be.

He knew he had more than enough staff to run his enterprise so, in order to reduce the cost per hectare, he took on a tenancy, which spread the cost of labour across a higher acreage. The labour and machinery review carried out on his farm highlighted just how much he saved per hectare.

Having never paid rent before, the tenancy was a risk for Colin. However, he did know the history of the land, so he knew what it was capable of and the opportunities available to him, including putting some land into conservation schemes.

Knowing more about the background to healthier soils through the Monitor Farm programme has enabled Colin to tackle what he feels are underperforming soils. The extra land also helps his aim to build soil health as a means of integrated pest management (IPM). He said: "With the loss of actives, the way to ensure you have a healthy plant is to make sure you have healthy soil – if the soil is empty, there's no reserve to get the plant through times of stress."

Before the review, Colin's figures were based on straight-line depreciation, which made his machinery a big cost to the business. However, by looking at the whole life span of his machinery, Colin was immediately able to reduce his costs per hectare without changing anything on the farm.

As a result of the review, Colin decided to hire a combine rather than owning his own, which negated depreciation costs. Having an eye for detail and seizing opportunities has meant Colin has saved £12 per hectare.

"I definitely don't have all the answers, but I'm better prepared to tackle bigger issues, such as reducing fixed costs and soil health problems, as a result of the Monitor Farm process," he said.

During the next season of Monitor Farm meetings, Colin would like to discuss how to control fixed costs. He knows that reduced variable costs are in their own grasp, but how can he further reduce fixed costs?

## DATES FOR YOUR DIARY

**Monitor Farm meetings:**

- **Newark: 7 June 2019**
- **Vale of Belvoir: 20 June 2019**
- **Brigg: 26 June 2019**
- **Northampton: 2 July 2019**

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## **REAPING REWARDS:** IN YOUR AREA

# Scotland

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## BENCHMARKING: WE LOVE IT

Cereal farmer Alan Grant is well aware that not all farmers have his in-depth understanding of costs.

"Some people just don't know where they are," he said, "but you have to measure what you are doing so you know where you can make changes. That's why we benchmark, and, honestly, we love it."

Alan, whose family has farmed in Aberdeenshire since 1926, began benchmarking in 2011 after joining a business group attached to AHDB's Aberdeen Monitor Farm. Not only has it given him a better understanding of his own business, he has also been able to make changes to improve his margins.

As well as taking on more land to contract farm, he also carries out other jobs on local farms, such as spraying, which allows him to justify the expensive machinery often needed to farm effectively today.

"Someone once said to me, if you buy a bigger tractor, you need to buy another farm. The kit nowadays is so expensive, every farmer can't own separate combines and tractors. The same machinery needs to be operating over larger areas, which is what we are now doing," Alan said.

Another change Alan has made, along with other members of the business group, has been switching to liquid fertiliser – not only does he find it quicker, easier and cheaper, but it also avoids overlaps in the field.

"It really improves accuracy," he said, "and you can put it on any time rather than having to wait for ideal conditions, which makes life much easier."

Having been benchmarking for a number of years, Alan has some tips for other farmers thinking about giving Farmbench a go.

"You need to be disciplined, make sure you get your numbers in by a certain date so you can meet with other farmers to compare and contrast. Attention to detail is key – the more you understand about your inputs and outputs, the better. I've always noticed farmers with less land do better in terms of yield as they can really focus on those areas.

"But remember to have fun. Our get-togethers aren't just about figures but about learning from each other and having a laugh."

## DATES FOR YOUR DIARY

**Monitor Farm meetings:**

- **Shetland: 8 June 2019**
- **Angus: 27 June 2019**
- **Borders: 17 July 2019**
- **Lothians: 19 July 2019**
- **Angus: 25 July 2019**
- **Sutherland: 31 July 2019**

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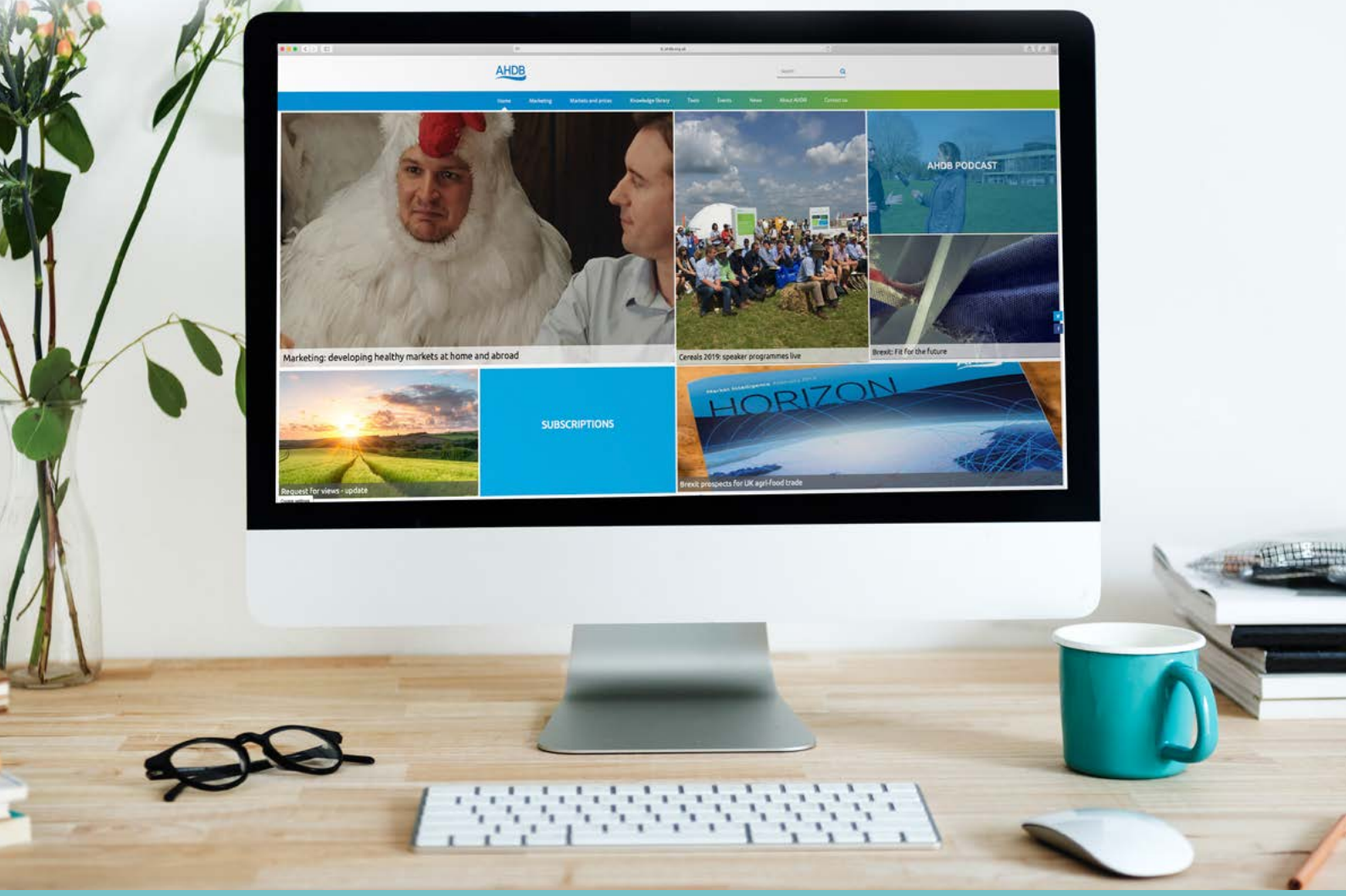


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