





Crop Action

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Highlights

In this issue:

- Wet weather and saturated soils return over previous two weeks
- ALS resistance identified in bromes in the UK
- Mode of action map updated by Herbicide Resistance Action Committee
- Fungicide Margin Challenge results!
- Consider second phoma sprays where plants are small
- High levels of light leaf spot infection being reported
- Watch out for bean seed fly in spring sowings of peas and beans
- Pulse YEN 2019 summary
- Countryside Stewardship open for 2020 applications
- What are the benefits of nutrient management planning
- Have you considered a new sprayer filling area?
- Are you interested in LEAF Open Farm Sunday 2020?

BASIS: CP/84120/1920/g (2 points) NRoSO: NO463937f (2 points)

Weather comments

Thomas Wilkinson

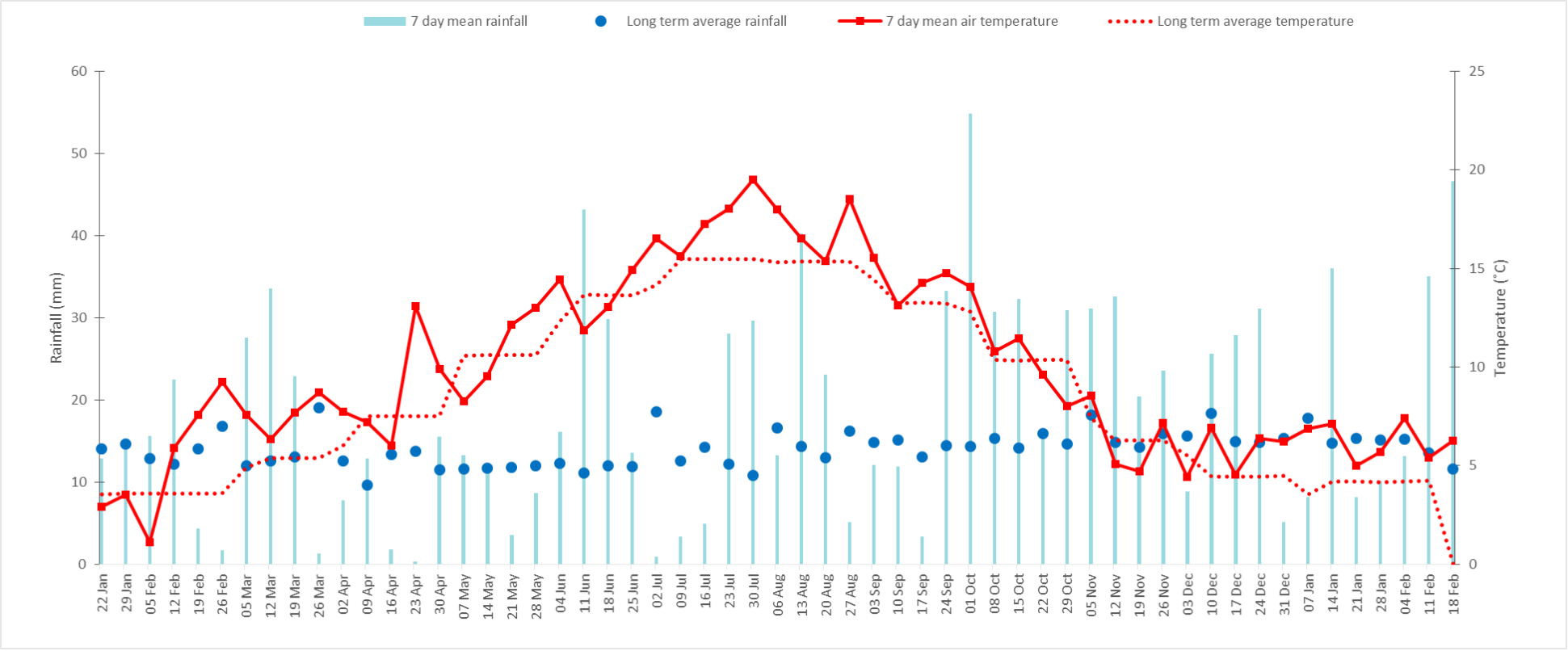

Figure 1: Weekly average GB rainfall (mm) and temperature (°C) from week ending 22 January 2019 to 18 February 2020.

Note: the Met Office updated the Long Term Average from 14 January 2020. Long term average prior to this point is based on data 1961-1990 and from this point onwards is based on data 1981-2010.

Heavy rainfall has been recorded across the UK over the past two weeks, with reports of waterlogged and flooded fields. In comparison with the long term average across the UK the week ending Tuesday 18 February recorded four times as much rain as we might have expected with 47 mm. The previous week ending Tuesday 11 February recorded 2.6 times the long term average with 35 mm of rainfall. For the week ending 18 February, the north west was wettest with 75 mm of rain, followed by Wales (53 mm) and the south west (53 mm). The driest region was the eastern region with 25 mm. A full county means breakdown of the previous two weeks weather data including rainfall can be found in the tables at the end of each issue of Crop Action.

The UK average temperature has remained above the long term average over the last two weeks. The average temperature recorded across the UK, 6.3°C, was 2.1°C above the long term average for the week ending 18 February. The south east, south west and Wales were the warmest at 7.4 – 7.5°C and Scotland was the coolest at 4.4°C.

For the week ending 11 February, the average temperature recorded across the UK, 5.4°C, was 1.2°C above the long term average.

Wet and windy weather is expected to continue towards the weekend, with the south being potentially less wet than other areas. Showers and rain are predicted over the weekend with spells of windy and wet weather continuing into next week.

Cereals

Crop development

Thomas Wilkinson

Winter wheat – Drilling is ongoing in some areas and crop growth stages range from GS 13 to GS 30.

Winter barley – Reports of growth stages range from GS 13 to GS 30.

Winter oats - Typically the most advanced crops are GS22-24.

Weeds

Sarah Cook

ALS resistance in bromes identified in the UK

One population of **great brome (*Anisantha diandra*)**, **meadow brome (*Bromus commutatus*)** and three populations of **sterile brome (*Anisantha sterilis*)** have been shown to be resistant to ALS-inhibiting herbicides (mesosulfuron+ iodosulfuron and pyroxsulam) in the UK. The results were published in Pesticide management Science* this month. One population of **rye brome (*Bromus secalinus*)** was shown to have increased tolerance to ALS-inhibiting herbicides.

The type of resistance was identified as a point mutation at Trp-574 in meadow brome but NTSR/EMR in the other brome species.

These results originate from an AHDB project: 211200059** - Investigating the distribution and presence, and potential for herbicide resistance of UK brome species in arable farming

What does this mean for UK farmers?

The good news is that all brome populations tested were sensitive to propaquizafop, although resistance to propaquizafop and cycloxydim in sterile brome was identified in Germany in 2012.

Additionally all bromes tested were still controlled by 360g a.i/ha of glyphosate although some populations showed increased tolerance at this rate. All populations were well controlled by 540g a.i/ha of glyphosate the recommended field rate for annual grass weeds.

The results indicate that although ALS resistance is evolving in brome populations other modes of action can be used to control these populations

in a diverse rotation but growers should be alert to the risk of the evolution of rapid herbicide resistance to other modes of action in UK bromes.

Full abstract from the paper*

Background

Anisantha and *Bromus* spp. are widespread and difficult to control, potentially due to the evolution of herbicide resistance. In this study, UK populations of four brome species have been tested for the early development of resistance to acetolactate synthase inhibiting herbicides commonly used in their control.

Results

Glasshouse assays confirmed reduced sensitivity to ALS-inhibiting herbicides in single populations of *A. diandra*, *B. commutatus*, and *B. secalinus*, and in three populations of *A. sterilis*. In contrast, all 60 brome populations tested were sensitive to the ACCase-inhibiting herbicide propaquizafop and glyphosate. Dose–response with two ALS herbicides showed broad-ranging resistance in the *A. diandra*, *A. sterilis*, and *B. commutatus* populations. In the *B. commutatus* population, this was associated with a point mutation in the ALS enzyme conferring target site resistance (TSR). Additionally, resistant populations of *A. sterilis* and *B. commutatus* populations contained enhanced levels of an orthologue of the glutathione transferase phi (F) class 1 (GSTF1) protein, a functional biomarker of non-target site resistance (NTSR) in *Alopecurus myosuroides*. NTSR was further evidenced as these plants also demonstrated an enhanced capacity to detoxify herbicides.

Conclusion

This study confirms the evolution of resistance to ALS inhibiting herbicides in brome species in the UK by mechanisms consistent with the evolution of both TSR and NTSR. These findings point to the need for increased vigilance in detecting and mitigating against the evolution of herbicide resistance in brome species in Northern Europe.

*Laura R Davies, Nawaporn Onkokesung, Melissa Brazier-Hicks, Robert Edwards and Stephen Moss (2020) Detection and characterisation of resistance to acetolactate synthase inhibiting herbicides in *Anisantha* and *Bromus* species in the United Kingdom. Pesticide management science https://onlinelibrary.wiley.com/doi/abs/10.1002/ps.5788

**AHDB project: 211200059 runs from March 2017 – February 2021. Funding: £218,000 (£183,000 to ADAS & £35,000 to Rothamsted Research), plus £10,000 each in-kind from BASF, Bayer, Monsanto (now Bayer), Corteva & UPL.

Updated HRAC mode of action classifications

The herbicide resistance action committee have updated the mode of action map which can be found at https://hracglobal.com/files/HRAC_Revised_MOA_Classification_Herbicides_Poster.pdf The classification system has moved from letters to numbers, a few examples are given below:

Updated HRAC	Legacy HRAC	Mode of action	Example
1	A	Inhibition of ACCase	'Fops', 'dims', 'dens'
2	B	Inhibition of ALS	Sulfonylureas
3	K1	Inhibition of microtubule assembly	Pendimethalin
4	O	Auxin mimics	Clopyralid

As an alternative an easy to use lookup facility is available here https://hracglobal.com/tools/classification-lookup

Winter wheat

There has been little change since the last issue. Some drilling was attempted but few herbicides were applied. Seedbeds are generally cloddy and could do with rolling.

The warmer temperatures have led to some germination of **broad-leaved weeds** and **wild oats** but there have not been any major flushes yet. All autumn germinating weeds are large, particularly the **umbellifers** making them difficult to control.

Spring barley

Depending on the weed spectrum expected, herbicides can range from a single diflufenican application through to flufenacet based products.

Diseases

Chloe Morgan

The Fungicide Margin Challenge

With a number of high yielding, disease resistant wheat varieties on the market there is an opportunity to reduce fungicide inputs and therefore increase margins. In 2019 ADAS launched the Fungicide Margin Challenge, inviting growers, agronomists and agrochemical companies to devise a fungicide programme to test against ADAS experts in a fully randomised plot trial. A high input four spray blockbuster and a completely untreated programme were also included to generate the highest and lowest yield potential. Decisions were made a week before spraying took place, giving everyone the opportunity to fine-tune applications based on the disease risk.

The challenge took place in one field of Graham on a Herefordshire farm. It showed that while the highest yield of 12.1t/ha came from the most expensive four-spray blockbuster programme costing £188/ha, it gave the lowest margin over fungicide costs of £1575/ha. It is well-known that a high loading of fungicide gives a yield benefit, but this is not always the most profitable approach. The ADAS experts programme, which had a fungicide cost of £95/ha, resulted in a slightly lower yield of 11.88t/ha. However, it gave the highest margin of £1649/ha which was £74/ha ahead of the belt-and-braces regime. In this programme, a T0 spray was omitted and the T1 treatment was scaled back, as it was dry in March and April and disease pressure at that time was low. As a result, an SDHI was not considered necessary with half rate epoxiconazole being applied with two multi-sites, chlorothalonil and mancozeb. Work has been done on mixing multi-sites which has shown an advantage as there is often a synergy between products. The T2 spray was based on the two SDHIs/azole co-formulation Ascra, with two multi-sites being added again, in the form of chlorothalonil and folpet. This was followed by a T3 of prothioconazole/tebuconazole in the form of Prosaro at 0.8l/ha applied with another multi-site, mancozeb, deemed necessary given June rainfall. All entries had a T1 and T2 spray, with the use of T0 and T3 varying. An SDHI featured in every T2 treatment.

Herefordshire farm manager Mark Wood of J.P.F Clay Farms came a very close second to the ADAS experts, with a margin of £1648/ha. His three-spray programme of a T1, T2 and T3 included SDHIs at both T1 and T2 and a strong T3. Assistant farm manager Jack Hopkins took third place, with a much lower fungicide spend of £59/ha and a lower yield. His two-spray programme of a T1 and a T2 saw him come in with a margin of £1638/ha.

These results show that when inputs are targeted appropriately to varieties, there is scope for savings. Of course, the usual wisdom applies, as programmes also need to reflect the season, the site and other agronomic factors, such as drilling date. This challenge is running again in 2020 click here for more information.

Oilseeds

Crop development

Thomas Wilkinson

Winter oilseed rape – Areas of some crops are beginning to show signs of stem extension. Crops are typically at BBCH GS31 but range between BBCH 19-50.

Weeds

Sarah Cook

Winter oilseed rape

There are some **charlock** and **sowthistles** that need to be removed. Bifenox is being applied and products containing clopyralid are being planned after 1st March.

Where propyzamide was not applied carbetamide is approved for application up until the end of February.

Diseases

Philip Walker

Phoma leaf spot re-infection has been reported across the county predominately on susceptible rape varieties. Where plants are very small, second phoma sprays can be justified until mid-February because the risk of yield loss remains high.

Light leaf spot continues to be reported with high infection levels seen on leaves of susceptible varieties after incubation. Incubation of plants for 24-48 hours helps to confirm the diagnosis of light leaf spot, by substantially increasing the recorded incidence, as this method encourages development of the distinctive white spore droplets. In some cases symptoms of the disease are now also visible in the field without the need for incubation. Later symptoms include the development of mealy blotches with a pinkish white centre and spore droplets around the edge of the lesion (Figure 2).

The Bayer SpotCheck initiative has identified positive signs of light leaf spot in counties from around the country in the north, east, west, Midlands, Scotland and Wales. There is no threshold for light leaf spot and fungicides should be applied at the first signs of the disease, even where autumn applications have been made. Fungicides are most effective when applied protectantly, however, control can also be achieved when they are applied at the first signs of the disease or at the first opportunity after light leaf spot is found.

Figure 2. Light leaf spot sporulation with lesion on a susceptible variety. Source: ADAS.

Wet ground conditions have been favourable for **clubroot** this winter and symptoms have been reported in fields in Pembrokeshire and Shropshire. As the weather warms in spring, check plants for signs of infection by pulling them up and looking for gall formations on the roots (Figure 3).

Figure 3: Early clubroot symptoms with gall formations on roots.

SpotCheck, a collaboration between Bayer and ADAS, with extensive support from the Association of Independent Crop Consultants (AICC) will be running until 31st March 2020. ADAS will be undertaking assessments of leaves sent in by growers to make a conclusive diagnosis of **light leaf spot**. Samples will also be examined for phoma, **powdery mildew** and **downy mildew**. To use the service just telephone ADAS Boxworth – 01954 268200 or 01954 268307 to request a sample kit.

To find out more about SpotCheck including nationwide results from the initiative in 2018/19 go to: https://cropscience.bayer.co.uk/spotcheck

ACTION

- Monitor oilseed rape crops for phoma leaf spot and light leaf spot.
- Remember that a second fungicide application may be beneficial for phoma leaf spot control if there is re-infection and plants are very small.
- Treat for light leaf spot prior to stem extension as soon as it is found as there is no threshold for this disease.
- Aim to use fungicide mixtures and alternate different modes of action throughout the entire fungicide programme to minimise the threat of development of resistance.
- Check fields with a previous history of clubroot for signs of infection. If symptoms are present test soils for clubroot and pH and use the results to plan your future farm strategy.

Pulses

Crop Development

Thomas Wilkinson

Reports of drilling winter beans continue, some crops are at GS14.

Pests

Steve Ellis

Spring sowings of peas and Phaseolus beans are at potential risk from **bean seed fly.** This is a ubiquitous pest which will attack a wide range of crops.

Female bean seed fly prefer to lay their eggs in freshly disturbed soil particularly where there are residues of vegetable matter or where farmyard manure has been applied. The presence of plants is not required

for bean seed fly to lay their eggs. Attack from these pests can result in vining peas and dwarf French beans sown from late April onwards failing to establish.

The flies lay eggs on the soil surface and larvae hatch after a few days to feed on newly planted seeds or on plant and crop debris. After 10-14 days, larvae pupate and this stage lasts 12-21 days before a second generation of flies emerges. There may be several overlapping generations each year occurring from late spring to early autumn.

In peas and faba beans secondary shoots may be formed to compensate for the damage to the growing point. In Phaseolus beans this does not happen and larval feeding may result in a 'baldhead' symptom, where the stem elongates but no terminal leaves are present. Severely damaged seeds of all crops can rot and fail to emerge.

Crops sown in late spring and early summer are most susceptible to attack, so seed-bed preparation should ensure that weed growth has died back before cultivation and that there is little or no green material in the soil. PGRO recommend that destruction of weeds and cover crops should take place at least three weeks before drilling.

There are no seed treatments available for bean seed fly control in peas and beans in the UK, and insecticide sprays are unlikely to be effective as the pest feeds below soil level.

ACTION

- Ensure good seed bed preparation to combat bean seed fly.
- Destroy weeds and cover crops at least three weeks before drilling to minimise the risk from bean seed fly attack.

Pulse YEN 2019 summary

Thomas Wilkinson

ADAS and PGRO established the Pea Yield Enhancement Network (Pea YEN) in 2016 and launched the Pilot Bean Yield Enhancement Network (Bean YEN) in 2019. The aim of both the Pea YEN and Bean YEN is to gain a better understanding of yield formation and to identify the most common factors constraining yields in the UK. The Pea YEN and Bean YEN do not contain competition aspects and are based solely on '**Share to Learn**' principals.

Local weather data and information from the farmer on soil texture allow biophysical yield potentials to be estimated anywhere. The YEN yield potential model was adapted for peas and beans from the previous Cereal YEN model, to account for the costs of N fixation and to include a shallower rooting depth. Based on the 2019 models assuming silty-loam soils, the **2018-19 season potential yield** calculated for **peas** across the UK ranged from **6 to 12 t/ha**. Likewise, the potential yield for **winter beans** ranged between **12 and 15 t/ha**, and for **spring beans** between **11 and 15 t/ha**.

Pea YEN 2019 recorded **19 completed entries**, with yields ranging from **2.3 - 6.5 t/ha**. The **percentage of potential yields** achieved ranged from **27 - 72 %**. **Bean YEN 2019** recorded **20 entries**, of which **nine were winter beans** yielding **4.1 - 8.0 t/ha**. **Eleven spring bean** entries were received yielding **4.0 - 7.0 t/ha**. The **percentage of potential yields** achieved ranged from **29 -59 %**, and **30-50 %** for winter and spring Beans respectively. As well as yields, key crop physiology measurements, management decisions and seed nutritional data (provided by Lancrop) were analysed for both YENs. Entries into the Pea YEN also included soil analysis (provided by NRM), leaf tissue testing (provided by Lancrop), seed quality assessment (provided by Askew and Barrett Ltd), foot rot estimation (provided by PGRO) and levels of soil Rhizobium analysis (provided by James Hutton Institute). Bean YEN included bruchid beetle damage assessment (provided by PGRO).

This information was benchmarked amongst the networks and returned to entrants at the end of the season in a detailed report at the winter results and discussion meetings for each of the networks. Experiences from longer running networks such as the Oilseed YEN and Cereal YENs have demonstrated the high value of benchmarking when datasets grow over years.

***Preliminary* analysis of the Pea YEN 2019 data set highlighted the positive association of plant population, harvested seeds/ m^2, as well as GS 34 leaf tissue N, Cu, P and Mg at GS 34 with yield.** Whilst these inferences may not be causal, and are based on currently small data sets compared to other longer running YENs such as Oilseed YEN and Cereal YEN, the success of the 2019 Pea YEN and Bean YEN show that powerful UK wide, long term data sets can be built for pulses following the same principals. This can ultimately inform the understanding of current pea and bean crops including benchmarks of what a 'good' crop looks like, constraints to high yields and best practices.

ADAS and PGRO are pleased to announce **registration is open** to **any interested individual or organisation** - commercial, academic or other, for both **Pea YEN 2020** and **Bean YEN 2020**. We aim to increase the size of our Pea YEN and Bean YEN networks to increase the power of the 'Share to Learn process'. There are also opportunities for commercial sponsorship.

- Official Pea YEN or Bean YEN sponsors can enter their own associated farmer entry for £250.
- Single farm owners can also enter for a reduced rate of £250.
- Entries sponsored by organisations who are not official Pea YEN or Bean YEN sponsors cost £350.

For more information on joining, or sponsorship see:

Pea YEN 2020 –

visit https://www.yen.adas.co.uk/projects/pea-yen

or email peayen@adas.co.uk

Bean YEN 2020 –

visit https://www.yen.adas.co.uk/projects/bean-yen

or email beanyen@adas.co.uk

PEA YEN 2019 SPONSORS / BEAN YEN 2019 SPONSORS

Countryside Stewardship opens for 2020 applications

Zoe Morgan

The 2020 Countryside Stewardship Scheme application window opened on Tuesday 11th February). Mid-Tier will remain open for applications until **31st July**, including the four simplified Wildlife Offers, and Capital Only grants for improving water quality. Hedgerows and Boundaries grants are also available again this year, with an earlier closing date for applications of **1st May**.

The RPA have also provided new information on the transition from Countryside Stewardship to the Environmental Land Management (ELM) scheme, which will be in place from 2024. When the ELM scheme comes into place, Countryside Stewardship Scheme holders will be able to apply for ELM. Successful applicants to ELM will be able to terminate their Countryside Stewardship agreements early, without penalty, to join the ELM scheme.

Making Countryside Stewardship a success on your farm starts right at the beginning with a well thought out application. Here we share our top tips for making Countryside Stewardship work for you.

1. Tailor your application to your system.
   Take time to understand the detailed requirements of all the options you have selected before applying. Make sure it will be practical to fulfil all requirements without negatively affecting the wider business. Think about factors such as labour availability, cultivation timings and weed pressures. Choose options which complement your current activities rather than conflicting with them.
2. Take advantage of your underperforming areas.
   Every farm has areas which struggle to perform – a wet patch, a difficult field or an awkward corner. Placing stewardship options on these areas means they can contribute a reliable source of income, while allowing you to focus on optimising performance on the better areas of your farm. Do bear in mind however, that options such as flower mixes may struggle in areas with poor crop performance, and be sure to choose options which will tolerate the conditions.
3. Work towards local priorities
   The countryside is divided into National Character Areas, which each have local priorities relating to issues such as biodiversity, water quality and landscape. By choosing options which work towards your local priorities, your application will be considered more competitive, and therefore more likely to receive funding. You will also be doing your bit to protect the important species and unique character of your local area, leaving the countryside in a better state for future generations.

The deadline to request an application pack for Mid-Tier is **31st May** for applications made by phone or email, or **30th June** for applications made online. If you would like advice or support on making an application to this year's scheme, please contact Zoe Morgan zoe.morgan@adas.co.uk 0771 676615.

The benefits of nutrient management planning.

Brendan Hunter

The value of farm nutrient management planning is gaining recognition as farmers and land managers increasingly want to make better use of their resources on-farm, reducing costs, optimising production and improving profitability. The purpose of a nutrient management plan (NMP) is to match nutrient inputs more accurately with crop requirements to improve crop performance. The NMP process assesses nutrient requirements on a field by field basis, rather than taking a blanket based approach. To get best

results nutrient planning should be undertaken every four years for each individual field in a grass based system.

Nutrient management planning is not only valuable to the farmer in optimising inputs; in England, since the Farming Rules for Water were introduced in April 2018, it is now a legal requirement to undertake nutrient management planning. More recently, the Welsh Governments Agricultural Pollution and Regulatory Reform written statement, cited nutrient management planning as one of its key measures to tackle pollution from agriculture. Pollution from agricultural sources, including nitrate and phosphate is a key water quality concern for all watercourses, and managing nutrients by implementing an NMP, will benefit the environment by ensuring nitrate and phosphate losses to water are minimised

Furthermore, with the introduction of the Code of Good Agricultural Practice for Reducing Ammonia Emissions, and the Governments Clean Air Strategy which both were released in England in early 2018, implementing best practice techniques to reduce ammonia emissions from agriculture appears likely to become a key issue. Nutrient management planning forms a significant part of this, in reducing ammonia losses to air by ensuring that nitrogen fertiliser or manures are applied in the right way at the right rate and the right time.

The Farming Rules for Water 2018: England

Since the Farming Rules for Water were introduced in April 2018, all farmers have been required to follow specific rules designed to standardise good farming practices, to prevent pollution, and protect water quality.

In essence the rules require farmers to:

- Keep soil on the land
- Match nutrients to crop and soil needs
- Keep livestock, fertilisers and manures out of water.

There are eight rules, five about managing fertiliser and manures, and three on managing soil, some of which farmers may already be complying with as there is some overlap with the NVZ regulations and Cross Compliance rules.

One of the rules which could catch some farmers out is a requirement to plan each application of fertiliser or manure in line with crop needs. This effectively requires nutrient management planning to be done on a field by field basis. Planning will have to take into account the results of soil testing for phosphorus, potassium, magnesium, and pH, (which must be less than five years old) and the Soil Nitrogen Supply (SNS), which should be calculated using fertiliser guide RB209.

Further information on the exact requirements can be found on the DEFRA website here:

https://www.gov.uk/guidance/rules-for-farmers-and-land-managers-to-prevent-water-pollution

New Rules for Water- Wales- These are yet to be announced

The value of soil analysis.

Nutrient management planning involves taking soil samples for standard analysis of phosphorus (P), potassium (K) and magnesium (Mg), and soil pH levels. Based on the soil analysis, past fertiliser use, organic manure applications and yields required for the following crop, nutrient recommendations are made using the AHDB Nutrient Management Guide (RB209) and/or a FACTS qualified advisor.

The nutrient value of organic manures such as slurry and farmyard manure (FYM) are taken into account to reduce reliance on bought in fertiliser. Additional guides such as MANNER NPK and Tried and Tested can be used to aid nutrient planning. Other factors taken into account in preparing a nutrient plan include soil type, rainfall and fertiliser application dates.

Using a Nutrient Management Plan.

Matching individual field requirements with specific nutrient applications will ensure that fields will not be over or under supplied with nutrients. The principle of an NMP is to encourage better utilisation of materials such as FYM, slurry and biosolids which are cheaper sources of nutrients.

For example, a field with a P index of 2 and K index of 2+ will be able to get its P and K nutrient requirement for grazing and one cut silage from a single application of FYM alone. In this case a nitrogen (N) based fertiliser such as ammonium nitrate (AN) or a product containing nitrogen and sulphur will be more appropriate than a compound and could save the farmer £15 - £20 an acre on first cut fertiliser.

By identifying low soil index fields farmers can target additional nutrient inputs where required and therefore optimise crop yields and quality. Correcting low soil pH is especially important on farms with high annual rainfall to prevent soils from becoming too acidic. Nutrient availability is reduced when pH is below optimum levels of 6.0 for grassland and 6.5 for arable crops, meaning crop performance will suffer Liming to correct and maintain the optimum soil pH, will improve soil structure, increase soil biology, and is also critical in ensuring nutrients already held in the soil or applied as fertiliser and manures, become available to a growing crop, which ultimately improves the bottom line.

How to access NMP advice.

ADAS provides independent on-farm advice for NMPs, NVZs and general management of nutrients from FACTS qualified advisors. For more information visit www.adas.uk, contact us on 0333 014 2950 or e-mail enquiries@adas.co.uk.

What's the point of a new sprayer filling area?

Charles Bentley

Though expenditure on upgrading sprayer filling areas can look like dead money, there are a number of good arguments for investing in improved facilities, particularly since grant aid for filling areas, biobeds, biofilters and roofing through Countryside Stewardship is available in many parts of the country. Revising and upgrading sprayer filling and washdown facilities provides an opportunity to improve productivity, reduce manual handling issues and minimise environmental risks.

Work during the late 1990's (Bayer CropScience Cherwell Study) found that around of 40% of pesticides detected in surface waters were likely to be derived from the sprayer filling site. The proportion is likely to vary from year to year and over time as losses from the field are generally greater in wet winters than dry. Also practices have in general improved over time, although the filling area is still likely to remain a major contributor on many farms.

In-field washout and improved sprayer filling/washdown areas with an impermeable base and contained drainage dramatically reduce the risks. Simply diverting drainage to a tank whilst the filling area is in use will help stop pollution in the event of a catastrophic failure or overflow. As residues of concentrate spills and splashes (few people can empty a 20l container into an induction hopper without some drips and spots) continue to leach product into surface water for several weeks, drain diversion is not an effective solution.

From an operational perspective a sprayer is only truly gainfully employed when it is the field applying product, and this can represent less than 30% of engine hours. Anything that can be done to improve turn round times will be beneficial. Locating the filling area alongside the spray store, with

access from the store to a point alongside the induction hopper of the parked sprayer minimises the time and effort spent lugging product out of the store. A drive through filling area, generally with the spray store to the left of the filling area as you drive in (only one major manufacturer consistently puts the induction hopper anywhere other than the left hand side of the sprayer) is the ideal as it minimises the risks associated with reversing into a building or out onto a yard and other traffic.

A suitable mixing/measuring table can be very useful, especially with small sprayers where a load may not require a full container of product. Second-hand catering equipment – stainless benches, sinks and drainers – is often well suited to this role. Adequate drainage for rinsed containers is critical in minimising losses and ensuring as much of the expensive product as possible ends up on the crop.

Countryside Stewardship/Catchment Sensitive Farming Water Grants will fund sprayer filling areas in high priority areas for water – check for red areas on MAGIC under Stewardship Targeting, and talk to your local Catchment Sensitive Farming Officer. Funding for roofing is currently around £62/ m^2, filling area concrete £40/ m^2, biobeds £77/ m^2 and biofilters £990 per unit. A number of water companies will also provide support for improving facilities in their area, particularly where the site is in a sensitive location.

LEAF Open Farm Sunday 7 June 2020

Are you interested in opening your farm for LEAF Open Farm Sunday 7th June 2020? This is the farming industry's annual open day and is designed to help the public to understand what real farming is all about and to value British farming.

Every farm has a story to share with the local community. Most people have no idea how long crops takes to grow, the agronomy, science and technology involved, the amazing machinery and all the work that goes into managing soil, water and biodiversity on the farm. People are genuinely pleased to have the opportunity to visit a farm, meet a farmer and find out about British farming.

LEAF Open Farm Sunday is flexible so that all farmers can get involved. It is up to you to decide who attends, when and what they see. If it is your first event you can keep it as small and simple as you want. Research shows that LEAF Open Farm Sunday events are having a huge positive impact: connecting the public with farming; educating the public; changing people's attitudes to buying more British produce; raising the profile of your farm and the whole farming industry. It helps to build stronger links with neighbours and the local community so that they understand what you do on the farm and what is going on in the fields around them.

LEAF are organising six LOFS networking and information events for farmers in March and April with presentations by experienced hosts including top tips on planning, promotion, activities and communicating your farming story. More information and the LOFS farmer Information Pack can be viewed at www.farmsunday.org/open-my-farm. If you have any questions contact the LEAF office on 024 76413911 or email openfarmsunday@leafuk.org .

Weather data

TEMPERATURES/SMD/RAINFALL/SUNSHINE HOURS BY COUNTY FOR WEEK ENDING 18 02 20

© Crown copyright Met Office 2017	Mean Air Temperature		30 cm Soil Temperature		Soil Moisture Deficit (Wheat-Medium AWC)	Rainfall		Sunshine		Excess Rainfall (Grass-Medium AWC)
	Actual °C	Diff from Normal	Actual °C	Diff from Normal	mm	Actual mm	% of Normal	Actual Hours	% of Normal	mm
Cleveland (with Durham)	5.7	1.5	5.1	1.1	0	35.5	372.2	16.1	83	29.4
Durham	5.1	1.3	4.8	0.9	0	36.6	416.9	17.1	86.6	41.8
Northumberland	4	0.8	4.3	0.6	0.9	45.3	193.9	10.4	59.6	31.2
Tyne & Wear (with Nth'land)	5.2	1.2	4.7	0.8	1.2	27.7	291.1	18	91.2	25.7
NORTH EAST REGION	5	1.2	4.7	0.8	0.5	36.3	318.5	15.4	80.1	32
Cumbria	4.1	1.2	4.8	1.2	0	75.4	271.4	4.8	33.4	68.6
Cheshire	6.4	2.3	5.4	1	0	46.1	431.6	15.9	93.1	42
Lancashire	5.4	1.5	5.3	1.2	0	103.7	392.1	9.5	55.3	58.2
NORTH WEST REGION	5.3	1.7	5.2	1.2	0	75.1	365	10.1	60.6	56.3
Humberside	6.6	2.1	5.4	1	0	41.1	420.1	14.1	74.2	33.9
N Yorkshire	5.5	1.9	5.1	1.3	0	39.2	302.5	13.5	79.5	37.5
S Yorkshire	6	1.9	5.4	1	0					36.8
W Yorkshire	4.8	1.7	4.4	0.7	0	68.2	319.2	5.5	32.5	54.3
YORKS & HUMBERSIDE	5.7	1.9	5.1	1	0	49.5	347.2	11	62.1	40.6
Derbyshire	6.5	2.3	5.4	0.9	0	36.8	612.8	18.6	93.3	47.7
Leicestershire	6.6	2.7	5.7	1.1	0	29.8	429.7	20.7	103.4	32.5
Lincolnshire	6.6	2.5	5.1	0.8	0	41.7	437.6	21.1	106.3	30
Northants	6.6	2.7	5.7	1.1	0	29.8	368.3	20.7	103.4	27
Nottinghamshire	6.4	2.4	5.4	0.9	0	44.9	415.8	16.4	87.1	33.9
EAST MIDLANDS REGION	6.5	2.5	5.5	1	0	36.6	452.8	19.5	98.7	34.2

© Crown copyright Met Office 2017	Mean Air Temperature		30 cm Soil Temperature		Soil Moisture Deficit (Wheat-Medium AWC)	Rainfall		Sunshine		Excess Rainfall (Grass-Medium AWC)
	Actual °C	Diff from Normal	Actual °C	Diff from Normal	mm	Actual mm	% of Normal	Actual Hours	% of Normal	mm
Hereford & Worcester	6.7	2.3	6.1	1.1	0	55.1	554.2	14.9	85.1	51.1
Shropshire	6.3	2.1	5.9	0.9	0	58.1	494.7	14.3	81.5	49.1
Staffordshire	6.3	2.2	6.2	1.1	0	43.8	625.7	13.1	75	51.8
Warwickshire	6.7	2.7	5.8	1.2	0	37	428.8			34.3
WEST MIDLANDS REGION	6.5	2.3	6	1.1	0	48.5	525.8	14.1	80.5	46.6
Bedfordshire	6.5	2.4	5.7	1.1	0	26.2	401.3	20.7	103.4	27.9
Hertfordshire	7.2	2.3	6.4	1.1	0	36.3	403.8	17.6		34.6
Essex	7.2	3	6.2	1.2	0.3	23	312.4	23.2	115.6	20.4
Cambridgeshire	6.6	2.8	5.9	1.2	0	21.1	275.5	21.3	106.1	19
Norfolk	6.9	2.7	6.4	1.6	0.3	26.2	246.2	21.8	113.4	15.8
Suffolk	6.8	2.9	6.1	1.5	0.6	16	209.8	21.8	110.4	12.2
EASTERN REGION	6.9	2.7	6.1	1.3	0.2	24.8	308.2	21	109.8	21.6
Berkshire	7.7	3.3	6.7	1.6	0	39.6	522.7	16	86.7	46.1
Buckingham	7.3	2.9	6.7	1.5	0	44	427.5	16	86.7	39.7
East Sussex	7.1	2.6	6.8	1.5	0	67.9	509.2	14.1	76	60.3
Hampshire	7.6	2.8	7.3	1.7	0	64.8	522	13.2	63.2	64.8
Isle of Wight	8.1	2.8	7.7	2.1	0	57.8	480.9	12.3	58.8	55.1
Kent	7.4	2.8	6.6	2	0.3	33.2	575.4	23.7	117.4	42.9
Oxfordshire	6.8	2.6	6.8	1.6	0	48.3	459.2	16.1	85	43.4
Surrey	8	2.8	6.8		0	38.4	743	16	85.1	65.8
West Sussex	7.7	2.7	7.1	1.4	0	43.9	659.8	20.9	102.6	65.8
SOUTH EAST REGION	7.5	2.8	6.9	1.7	0	48.7	544.4	16.5	84.6	53.8
Avon (included with Gloucs)	6.8	2.6	6.8	1.9	0	50	525.6	14	73	58.3
Cornwall (inc Isles of Scilly)	8.2	1.7	9.7	2.9	0	64.1	368.3	8.5	42.3	66

© Crown copyright Met Office 2017	Mean Air Temperature		30 cm Soil Temperature		Soil Moisture Deficit (Wheat-Medium AWC)	Rainfall		Sunshine		Excess Rainfall (Grass-Medium AWC)
	Actual °C	Diff from Normal	Actual °C	Diff from Normal	mm	Actual mm	% of Normal	Actual Hours	% of Normal	mm
Devon	7.7	2.6	7.3	1.2	0	62.3	410.7	14.1	73.7	66.9
Dorset	8.4	2.8	7.4	1.9	0	39.3	425.1	12.3	59.5	51.7
Gloucestershire	6.7	2.7	6.6	1.9	0	52	554.5	16.1	83.6	54.8
Somerset	7.1	2.5	7	1.2	0	50.2	499.6	12	63.7	54.1
Wiltshire	6.8	2.5	6.8	1.8	0	50.6	459.6	12.8	66.7	51.1
SOUTH WEST REGION	7.4	2.5	7.4	1.8	0	52.6	463.3	12.8	66.1	57.6
Clwyd	7.9	2.7	6	0.5	0	63.3	459.6	17.5	83.8	48.7
Dyfed	7.4	2.1	6.9	1.2	0	62.9	502.6	12.9	67.9	81.5
Gwent	7	2.2	6.6	0.5	0	58.5	602.7	15.8	82.7	86.3
Gwynedd	6.6	1.5	6.5	0.9	0.7	58.6	222.9	15.7	75.2	52.6
M Glamorgan	7.7	2.1	7	1.1	0	56.6	488.6	16.4	83.6	77.3
Powys	7.3	3.3	5.8	0.8	0	54.9	432.1	15.7	90	57.1
S Glamorgan	7.7	2.4	7	1.1	0	55.8	473.1	16.4	84.3	73.7
W Glamorgan	7.8	2	6.8	1.1	0	57.3	535.3	15.3	75.8	85.1
WALES	7.4	2.3	6.6	0.9	0.1	58.5	464.6	15.7	80.4	70.3
North East Scotland	3.8	0.3	4	0.6	0.8	39.4	163.8	20	104	19.1
South East Scotland	4.6	0.7	4.6	0.6	0.5	28.9	290.6	16.5	93.1	30.4
South West Scotland	4.7	0.7	5.1	0.8	0.1	39.1	280.6	16.4	90.2	44.2
SCOTLAND	4.4	0.6	4.6	0.7	0.5	35.8	245	17.6	95.8	31.2

TEMPERATURES/SMD/RAINFALL/SUNSHINE HOURS BY COUNTY FOR WEEK ENDING 11 02 20

© Crown copyright Met Office 2017	Mean Air Temperature		30 cm Soil Temperature		Soil Moisture Deficit (Wheat-Medium AWC)	Rainfall		Sunshine		Excess Rainfall (Grass-Medium AWC)
	Actual °C	Diff from Normal	Actual °C	Diff from Normal	mm	Actual mm	% of Normal	Actual Hours	% of Normal	mm
Cleveland (with Durham)	4.9	0.8	5.2	1.2	0	27.5	346.6	24.7	127.3	26.8
Durham	4.6	0.9	5	1.1	0	30.3	434.3	21.2	107.4	43.6
Northumberland	3.8	0.5	4.8	1.2	0	62.8	230.8	11.5	65.9	38.7
Tyne & Wear (with Nth'land)	4.6	0.6	4.9	1.1	0	21.1	332.2			30
NORTH EAST REGION	4.5	0.7	5	1.1	0	35.4	336	19.1	100.2	34.8
Cumbria	4.1	1.2	5.3	1.7	0.1	94.9	283.6	12.7	88.4	72.4
Cheshire	5.3	1.2	5.6	1.3	0.2	23.6	333.9	24.6	143.8	31.5
Lancashire	5.3	1.4	5.6	1.6	0	132.3	466.8	18	104.2	70.4
NORTH WEST REGION	4.9	1.2	5.5	1.5	0.1	83.6	361.4	18.4	112.1	58.1
Humberside	5.4	0.9	5.3	0.9	0.9	34.4	326.2	27.9	146.8	25.6
N Yorkshire	4.6	1	5.1	1.3	0.3	37	262	18.8	110.4	30.4
S Yorkshire	5.3	1.2	5.6	1.2	0.4					33.9
W Yorkshire	4.3	1.2	4.9	1.2	0	100.2	371.5	11.5	67.9	64.3
YORKS & HUMBERSIDE	4.9	1.1	5.2	1.1	0.4	57.2	319.9	19.4	108.4	38.5
Derbyshire	5.2	1.1	5.4	0.9	0.6	29.2	444.5	24.8	124	33.8
Leicestershire	5.3	1.4	5.4	0.8	1.1	16.3	239.6	29.7	148.4	16.9
Lincolnshire	5.3	1.2	5.3	0.9	1	16.9	196.8	28.4	143	10.7
Northants	5.3	1.4	5.4	0.8	1.2	16.3	185.2	29.7	148.4	10.9
Nottinghamshire	5.3	1.3	5.4	0.9	1.1	27.6	245.9	25.1	133.2	18.5
EAST MIDLANDS REGION	5.3	1.3	5.3	0.8	1	21.2	262.4	27.5	139.4	18.2
Hereford & Worcester	5	0.7	6	1	0.8	26.2	257.3	22.4	128.4	19.5

© Crown copyright Met Office 2017	Mean Air Temperature		30 cm Soil Temperature		Soil Moisture Deficit (Wheat-Medium AWC)	Rainfall		Sunshine		Excess Rainfall (Grass-Medium AWC)
	Actual °C	Diff from Normal	Actual °C	Diff from Normal	mm	Actual mm	% of Normal	Actual Hours	% of Normal	mm
Shropshire	4.8	0.6	5.8	0.8	0.9	28.6	215	21.9	125.6	17.9
Staffordshire	4.8	0.7	6.2	1.1	1.1	21	293.2	23.3	133.3	21.4
Warwickshire	5.4	1.4	5.5	0.9	1.1	22.8	229.9			15.7
WEST MIDLANDS REGION	5	0.8	5.9	1	1	24.6	248.9	22.6	129.1	18.6
Bedfordshire	5.2	1.1	5.3	0.7	1.3	13	191.4	29.7	148.4	10
Hertfordshire	5.7	0.8	6.2	0.9	1.3	17.8	178.5	25.2		12.1
Essex	6.1	1.9	6.1	1.1	1.4	10.4	147.6	36.8	183.7	6.8
Cambridgeshire	5.5	1.7	5.7	1	1.3	10.2	139.1	32.8	164	7.1
Norfolk	5.4	1.2	6.2	1.4	1.3	14.4	139.6	36	187.2	6.9
Suffolk	5.9	1.9	6.1	1.5	1.4	7.4	106.5	36	182.3	3
EASTERN REGION	5.6	1.4	5.9	1.1	1.3	12.2	150.4	32.8	173.1	7.7
Berkshire	6.3	1.9	6.6	1.5	0.7	17.3	222.7	23.1	125.1	15.4
Buckingham	5.9	1.6	6.5	1.4	1.2	19.3	190.3	23.1	124.9	14.4
East Sussex	6.2	1.6	6.6	1.3	1.8	20	131.3	25.3	135.7	13.2
Hampshire	6.3	1.5	7.1	1.5	0.4	21.7	199.8	22.9	109.5	20.4
Isle of Wight	6.6	1.3	7.5	1.9	0.2	14.3	140.1	22.9	109.4	11.2
Kent	6.6	2.1	6.5	1.9	1.5	19	226.4	31.8	157.6	14.1
Oxfordshire	5.7	1.5	6.7	1.5	0.7	19.5	190.5	23.3	123	13.8
Surrey	6.7	1.5	6.7		1	17.8	296.8	23	122.3	23.3
West Sussex	6.6	1.6	6.9	1.2	1.5	15.6	217.5	30.7	150.3	19.1
SOUTH EAST REGION	6.3	1.6	6.8	1.5	1	18.3	201.7	25.1	128.7	16.1
Avon (included with Gloucs)	6.1	1.9	6.7	1.8	0	24.8	232.3	25.3	132.2	21.3
Cornwall (inc Isles of Scilly)	7.8	1.3	9.7	2.9	0	18.7	125.6	22.1	110	16.6
Devon	6.8	1.7	7	0.9	0	20.1	148.8	22.1	116	18.6

© Crown copyright Met Office 2017	Mean Air Temperature		30 cm Soil Temperature		Soil Moisture Deficit (Wheat-Medium AWC)	Rainfall		Sunshine		Excess Rainfall (Grass-Medium AWC)
	Actual °C	Diff from Normal	Actual °C	Diff from Normal	mm	Actual mm	% of Normal	Actual Hours	% of Normal	mm
Dorset	7.6	1.9	7.1	1.6	0	9	118.8	22.9	110.8	8.8
Gloucestershire	5.5	1.5	6.5	1.9	0.9	21.7	254.3	23.4	121.6	22.1
Somerset	6.1	1.5	6.8	1	0	22.3	164.5	24.9	132.1	12.3
Wiltshire	5.8	1.5	6.7	1.7	0.7	26.4	224	26.4	137.7	21.8
SOUTH WEST REGION	6.5	1.6	7.2	1.7	0.2	20.4	181.2	23.9	122.9	17.4
Clwyd	6.3	1.1	6.1	0.6	0.4	41.7	341.6	25	119.6	35
Dyfed	6.4	1.1	6.9	1.3	0.5	24.4	196.1	24.5	129	26.9
Gwent	6.1	1.3	6.5	0.4	0	26.1	235.7	22.8	119.2	29.1
Gwynedd	6	0.9	6.6	1.1	1	70.1	237.2	24.6	117.8	57.5
M Glamorgan	7	1.5	6.8	1	0	18.4	160.2	22.8	116	19.5
Powys	5.4	1.4	5.8	0.8	0.5	41.3	211.3	23.2	132.9	25
S Glamorgan	7	1.7	6.8	1	0	20.5	159.9	22.8	116.9	19.4
W Glamorgan	7.1	1.4	6.6	1	0	16	180.9	23.3	116.1	22.9
WALES	6.4	1.3	6.5	0.9	0.3	32.3	215.4	23.6	120.9	29.4
North East Scotland	4.1	0.7	4.5	1.1	0.4	34.4	199.7	25.3	131.9	23.9
South East Scotland	4.3	0.4	5.3	1.2	0	55.7	420	21.6	122.2	46.3
South West Scotland	4.7	0.7	5.7	1.5	0	45.2	329.2	18	99.2	53.1
SCOTLAND	4.4	0.6	5.1	1.3	0.1	45.1	316.3	21.7	117.8	41.1

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