Agronomy Conference 2023: questions and answers

Answers to delegate questions

raised during the Agronomy Conference on 7 December 2023

but not addressed (due to time constraints).

ahdb.org.uk/agronomy

Speaker abbreviations

KH: Kevin Havekes (Fane Valley)

MT: Mark Tripney (ISoils)

CH: Catherine Harries (AHDB)

PW: Philip Walker (ADAS)

TF: Tamara Fitters (ADAS)

SW: Sacha White (ADAS)

DB: Dhan Bhandari (AHDB)

JH: John Holland (independent agroecologist)

Session 1: Pests

Many breeders are working on BYDV resistant/tolerant varieties, with the development pipeline just hitting the AHDB Recommended Lists (RL). Will it influence IPM decisions strongly?

SW: Crop genetics are going to be an important tool for BYDV management. It should reduce the need for insecticides targeting the aphid vectors significantly. The pests may get around resistance, so the genetics will likely need protecting.

Are water areas, such as ponds, a contributor to natural pest control?

JH: Yes. Especially for hoverflies, as many species have an aquatic larval life stage. Water areas also support other pest-controlling groups, such as bats and insectivorous birds.

If increased plant diversity increases insect diversity, does it increase pest diversity?

SW: Monocultures often increase pest issues. It is possible that increased plant diversity may introduce new insects that feed on the crop. However, the impact of such insects is likely to be low, as feeding will be shared between the crop and the other plants. Additionally, increased plant diversity will increase natural enemy activity, which will reduce pest pressures, and may interfere with the ability of pests to find the crop.

For late-season aphid control, would you advocate the planting of late-flowering plant species in flower strips to provide late nectar for hoverfly and parasitic wasp adults?

SW: Yes. Recent survey work has found parasitic wasps active into November, so encouraging their activity with late-season nectar resources would be beneficial.

Predator-prey relationships show you never have enough of the insects you want when you need them. How practical is it to rely on natural enemies in IPM without production losses?

SW: By encouraging natural enemies alongside other approaches, such as trap crops, companion crops, spray thresholds, IPM can be reliable. Of course, IPM allows insecticides, preferably as a last resort to minimise their use – this will help natural enemies and minimise insecticide resistance risks.

IPM, resistance management and maximising benefits of beneficials require long-term planning. With farms facing so many immediate challenges (wet autumn, crop profitability) what measures would help accelerate uptake?

SW: The day-to-day challenges of farming are not to be underestimated. Equally, IPM, resistance management and maximising benefits of beneficials can be complex. People should use the tools and guidance available. For

example, the 'IPM Tool' (**ipmtool.net**) can help develop IPM programmes and IRAG guidance can guide insecticide management in major crops (**ahdb.org.uk/irag**).

Is the yield impact of CYDV the same as BYDV?

SW: Reports of the relative impact of CYDV and BYDV differ. Further work is needed to understand the impact of CYDV.

Do you see varietal differences in the amount of virus in wheat and barley?

SW: We haven't looked at this in our work.

Why do legislative barriers make it harder to approve pesticides for minor crops? It means they are grown less, and this reduces plant diversity in rotation, which does not benefit bees.

JH: Unfortunately, the cost of getting new products registered is high. It deters agchem companies from doing so where the market is small. Reducing the stringency of this legislation could allow products with higher impacts to used. Derogations can be obtained in some cases for existing products. Perhaps this could be made easier.

Does the Pest and Disease Survey cover all the UK?

SW: No. It covers England and Wales.

Session 2: Diseases

What was the resistance score of the variety used in the light leaf spot (LLS) trial in Scotland and what does the 2023 result suggest?

PW: The variety used at the Scotland (Edinburgh) site was Campus, which was previously rated as 6 for light leaf spot. For this site in this season, the nature of the disease pressure (early) meant disease-control effects for the products tested were not seen.

Why was the LLS data for 2022 and 2023 not added to the cross-year data, which only shows 2019–21?

PW: Disease levels were insufficient to determine the fungicide effect against light leaf spot and yield in 2022. The 2023 data was unique, with a much clearer timing effect from the autumn/winter application for light leaf spot severity reduction and yield. In the 2019–21 data, the effect was more balanced from the autumn/winter and spring application timings.

Were the LLS results on the single site statistically significant?

PW: The results presented from the single site for reduction in light leaf spot severity and yield responses from the untreated control are significant. Fungicide performance curves are not published if the results are insignificant.

Do the over-year fungicide performance graphs include all data or have sites with no response been excluded?

PW: Over-year graphs only include data where there is a significant response from the untreated control for the individual sites. They only include data where single site results have been previously presented. They do not include results from sites where no response was seen from the fungicides tested.

Do you plan to revisit the historical work on sclerotinia fungicide performance?

CH: We regularly review the diseases tested in trials. The economic importance of diseases guides our decisions, alongside other factors. If sclerotinia is highlighted as a particular concern, we would consider reintroducing testing to trials. However, this comes at a cost to the project.

Which products most commonly breach maximum residue level (MRLs)

DB: Over the seven-year sampling period, 18 pesticide residues (see list), at or above their corresponding MRLs, were detected in 16 samples. Out of the 2,625 samples tested, this equates to 0.6% of samples containing residues at or above their corresponding MRLs.

- 10x Chlorpropham (probably from a contaminated store)
- 2x Chlorpyrifos
- 2x DDAC (probably from surface contact with disinfected equipment)
- 1x Pirimiphos-methyl
- 1x 2,4-DB
- 1x 2-phenylphenol (from a peated malt)
- 1x Biphenyl (from a peated malt)

Why is there a significant difference between milling and feed wheat in the ergot alkaloid results? Is it due to climate, location or the fungicides used?

DB: It's difficult say why there appears to be a difference between milling and feed wheat samples. It is possible that agronomic practices play some part. The location of field margins with certain grasses, which act as hosts for ergot, is thought to be risk factor. There are no approved fungicides for ergot in the UK.

Is it expensive to test samples?

DB: The analytical testing for contaminants, such as mycotoxins, is relatively expensive, compared to rapid lateral flow devices. Prices vary depending on contaminant and the supplier. The Fera website states that bulk testing for pesticides can be cheaper than single sample testing – placing an order of 4 reduces the price to £182 per sample.

Do you look at samples of rye for ergot?

DB: No. However, rye processors test for ergot and its alkaloids regularly.

Session 3: Varieties

No unaddressed questions.

Session 4: Nutrition

Is the index system for P, K Mg the right way to assess soil when it only measures a fraction of the total nutrient in the soil?

MT: Basic soil analysis does not monitor soil health well enough. Much more detailed soil samples should be taken and include metrics like cation exchange capacity, organic matter, calcium, sodium and micronutrients. Use a broad-spectrum analysis and get proper interpretation.

KH: The basic test for P, K, Mg and pH does not provide a complete picture of soil nutrient status.

Yield will only amount to the availability of the most-limiting nutrient (Liebeg's barrel theory). For example. it doesn't really matter how much phosphorus is available if manganese is the limiting factor in crop yield. Therefore, producers should look at more broad-spectrum analysis to determine soil nutrient status.

A soil test only measures the level of available nutrient, not total soil reserves. Knowing the amount of total soil reserves doesn't serve much purpose if the plant can't extract the nutrient from the soil. So, I think the index system still works as an indicator.

Most soil test reports show mg/L or ppm to give you an idea if you are on the high or low end of the index. Obviously, by maintaining soil pH at a target of around 6.5, producers will ensure the highest level of all nutrients is available to the growing crop. This will have an influence on the measure of available nutrient, compared to a soil that is allowed to drop to significantly more acidic levels.

TF: The purpose of the index system is to predict how sufficient soil nutrient availability will be (in supporting crop growth) with values below 2 indicating insufficiency, and values above 3 indicating excess. Nothing fundamental has changed recently. The Index system is still helpful in this way.

However, recent harvest analyses of grain show that efficiencies of nutrient capture are extremely variable, so more attention must be paid to uptake processes – especially topsoil moisture and rooting – as well as to soil indices.

Reactivity of liming materials is arguably more important than the neutralising value (NV) – why is it not part of the standards?

MT: Yes, reactivity is more important than NV but it is not part of the 1991 fertiliser regulations. This is probably because they were based on 1930s grant regulations, with the assumption that most were purchasing ground lime.

However, the Agricultural Lime Association's (ALA) own AgLime Quality Standard (AQS), which all members have lime analysed under, does require that reactivity measurement is carried out on an annual basis. Therefore, ask for lime that is AQS approved and to see the analysis.

KH: Reactivity is a measure of NV and granulometry of a material and gives the best indication of how effective a liming material will be at affecting soil pH. As part of the AQS, each ALA member will have an analysis of the liming material they offer to the market and a reactivity score for their material. Unfortunately, reactivity has not made its way into legislation. Reactivity would be the best path forward to future legislative requirements.

Why do smaller lime particles affect pH more? Is it due to a larger surface area?

MT: Yes. Smaller lime particles have a greater surface area and react more quickly than large lumps. Anything over 1 mm is of limited use in a soil.

KH: Lime efficacy is best expressed in terms of reactivity, which is a measure of NV and granulometry. Particle size is only part of the equation, but it is mainly due to the larger surface area.

1 kg of 1 mm limestone will have a surface area of about 6000m^2, whereas 1kg of 0.1mm limestone will have a surface area of about 6,000,000m^2. This is like how a heavy clay/high organic matter soil has far more exchange

sites (CEC) on a particle of soil (vs a sandy soil). As such, there is far more surface area on a fine limestone to neutralise the H^+ions (that make the soil acidic). In a coarser particle, above 1mm, only the surface of the particle will react with the H^+ions around it. Once those ions are neutralised, the core of the coarse particle will remain in the soil inert until moved by mechanical means to soil that has not yet been neutralised.

Further, you can imagine, a 1mm particle of limestone isn't very mobile, whereas sub-100 µm particles will wash through fissures in the soil, moving from areas already neutralised to areas that are still acidic (deeper in the profile).

Is there a risk to germination when urea is applied to the seedbed in the spring (close to the seed)?

KH: There is a risk. It will depend on conditions on a field-by-field, farm-by-farm and season-by-season basis. Fertiliser injury can occur from ammonia toxicity when urea is placed very near the seed, as ammonia will be released during urea breakdown. This effect can be limited when soil moisture conditions are good, as the ammonia will rapidly convert to ammonium which minimises potential injury. Ammonia toxicity risk is greatest when using higher rates of urea, in low soil moisture conditions and when pH is above 7.5. Risk is also influenced by crop type, soil texture and coated/slow-release urea. Always talk with your agronomist before proceeding with seed placed urea.

TF: The risk will be less than if ammonium nitrate was used. Risk will be small, especially if urea quantities are small (<50 kg/ha N). The cause of risk will be more from ammonia toxicity than from any 'salt effect'. See Australian advice here.

How well do soil nitrogen predictions at the start of the season work for arable ground in the wetter parts of the UK, such as Northern Ireland?

KH: Regardless of the region, soil nitrogen supply (SNS) is a 'best guess' principle to provide guidance on how much nitrogen will be available to the growing crop and how much nitrogen to apply.

Certainly, in higher rainfall areas, there will be diminished levels of nitrogen. Even in wetter areas, rainfall will vary from season to season. As such, RB209's field assessment method of calculating SNS accounts for higher rainfall areas.

However, a properly taken soil nitrogen test will give the best indication, but other factors will need to be considered. Your agronomist will be best placed to give advice in this area.

TF: Soil nitrogen predictions are always uncertain. Adjustments based on over-winter rainfall and soil texture are crudely helpful. The best soil nitrogen predictions where winters are wet come from soil mineral nitrogen analysis.

