

First responders for field affliction

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Technical Crop Doctor

For so many reasons, spring 2020 will be one of the hardest to manage in terms of keeping disease under control. *CPM* joined the Crop Doctors as they took a virtual tour of England’s trial plots.

By Tom Allen-Stevens

The irony could barely be more pungent: the country’s on lockdown due to the biggest disease threat humanity may have faced in living memory. And it’s hampering the efforts of growers and agronomists across the UK to assess the disease threat facing the nation’s crops.

But it hasn’t stopped the Crop Doctors.

Every year, cereal pathogen experts Jonathan Blake of ADAS and SRUC’s Prof Fiona Burnett have taken a whistle-stop tour of the UK to assess the state of the nation’s cereal crops in an initiative supported by Bayer. They’ve reported on the fungal priorities that face Britain’s growers as they strive to bring healthy crops to harvest.

This year, COVID-19 may have grounded the helicopter, but it hasn’t quelled the quest. At four sites in Herefordshire, Oxon, Lincs and Yorks, trial plots were visited on the same day at the end of March by Bayer field representatives who assessed disease levels, took samples and photos. The Crop Doctors attended a web conference for each site, joined by a local grower or agronomist, and as the day progressed, the picture on pathogens became clear.

Rust knocks in Oxon

“You can see the yellow rust as soon as you go into the field,” reports Colin Woodward, farm manager of Great Tew Estate in the Cotswolds. He’s talking about his crop of Revelation, drilled into sandy loam ironstone soil in the last week of Oct. The variety has a disease score of 9 for yellow rust, according to the AHDB Recommended List, so Colin wants to know whether you can rely on adult resistance kicking in.

“It’s hard to know how to react to yellow rust at the moment,” notes Fiona. “We’re hoping resistant varieties will overcome early infections. But varietal resistance was variable last year, and the very fact

we’re using the word ‘hope’ is not a good sign.”

Monitoring undertaken by the UK Cereal Pathogen Virulence Survey (UKCPVS) has identified that many varieties are susceptible to yellow rust up to mid-tillering, but more resistant types tend to shake it off as



Yellow rust was evident on Revelation at the Great Tew Estate.



Every single plot at Long Sutton had septoria on the bottom leaves, even on Extase, but it's not currently moving.

stems begin to extend. "As each leaf emerges, the plant gradually becomes more resistant," explains Jonathan.

"The difficulty this year is that there are a lot of backward crops still at susceptible seedling stage and plenty of yellow rust around after a mild winter that's favoured the disease. Even if adult resistance does kick in, it could already have done significant damage. You don't want to risk this disease taking hold in your crops."

But this is Oxon — not usually a hotbed for the disease. So has Colin found a one-off? Not according to Bayer commercial technical manager Ben Giles who's been keeping a close eye on trial plots at nearby Hinton Waldrist, as part of monitoring commercial crops in the area.

"There's no yellow rust and quite low levels of disease overall in the trial plots, but there is more yellow rust in commercial crops locally. This could be related to the shift in varieties — as growers have opted for those with better septoria scores, we're noticing more yellow rust. But the levels



Conditions have favoured eyespot at Long Sutton, and LG Sundance is one of the more susceptible varieties, but so far none has been found.

we're seeing are not surprising given the mild winter we've had."

There are distinct differences between varieties in the plots themselves, Ben reports. "LG Skyscraper is romping away, LG Sundance is looking backward, as it always does at this stage, Graham and Shabras are growy. But cut them open and they're all at the same growth stage."

Septoria is present in autumn-drilled crops — "generally about where I'd expect with the winter rainfall and temperatures as they've been," notes Ben. "The KWS Barrel at Hinton, although susceptible to disease, is not as grubby as you might think. It's one of a number of varieties that's looking poor, but that's mainly because the rain has packed the soil down tight. KWS Extase is generally more upright, cleaner and growing away well, but not as free of septoria at the moment as its high disease score would suggest."

Fiona points out drilling date has greater relevance than varietal resistance to the level of septoria you're likely to see at this stage. "But when assessing growth stages, it's much more important to look at the crop in front of you than calendar date, and don't be misled by growth."

Colin's found plenty of septoria "lurking in the bottom of the crop and ready to go". But he's more concerned about how he manages his stock of chlorothalonil to ensure it's all used to best effect before the use-up date of 20 May.

"You can't use the same CTL product at both T0 and T1," notes Fiona. "CTL is more important at T1 for its protection against septoria. Azoles are better on rust, but equally we don't want wall-to-wall azoles at T0 as that will drive resistance."

Jonathan notes that CTL does nothing on rust, and can actually inhibit the activity of other material.

Colin plans to use Amistar Opti (azoxystrobin+ CTL) at T0, adding an azole where he's found yellow rust, and saving his straight CTL for T1 and on barley, targeting ramularia.

Coming out in The Wash

At Long Sutton in The Wash, yellow rust is a disease growers routinely manage. "We have Skyscraper, Graham, KWS Parkin and LG Prince and we've found yellow rust in every field except the Parkin," reports David Hoyles of GH Hoyles, who's joined the web conference from his sprayer.

"That's not unusual for us, but for the size of plants we have, drilled in Oct, we weren't expecting the levels we have, especially not on varieties with a score



KWS Barrel was one of a number of varieties in Oxon that's looking poor, mainly because the rain has packed it down tight.

for the disease of 8 and above."

He's been using a low dose of tebuconazole as a pre-T0 on earlier drilled wheats to stop yellow rust in its tracks, and plans to follow with a protectant fungicide to bridge the gap before T1. "On our later-drilled crops, just the TEB on its own may suffice," he adds.

It's a tactic that generally gets the thumbs-up from Fiona. "I'm not a fan of making more frequent trips through the crop, and it's essential that product choice doesn't drive resistance, but a dash of TEB followed by CTL with a strobilurin sounds a good idea."

Bayer's Darren Adkins shows photos from the trial plots. "Disease levels are reasonably low, but there's yellow rust on KWS Kinetic, Gleam and RGT Saki. Every single plot had septoria on the bottom leaves, even on Extase, but it's not currently moving." ▶



Blotches found on Graham in Herefordshire are believed to be a plant immune response, perhaps related to lock-up of trace elements in water-logged soils.



Contrasting levels of septoria were found at Hartpury on Elation (left) and Theodore.

► Drilled on 23 Oct, he's found low levels of wheat bulb fly activity, and David backs this up, with many of his later crops affected by dead heart. So far mildew and eyespot haven't made their presence known, though. "Eyespot in particular we're on the look-out for as there's not much varietal resistance on the RL, and conditions have favoured it, so we expect to find some as the T1 timing approaches," notes Darren.

Fiona echoes his concerns. "It's good to see that growers are moving to more septoria-resistant varieties, but eyespot is a potential weakness and a reason to include an SDHI at T1."

That's David's plan. "Ascras certainly looks a good option for us and is priced well. What we'll spray at T2 will obviously be dependent on the season. But logistics is an issue we must plan for — restrictions with COVID-19 will mean we can't rely on spot orders or next day delivery."

Fiona agrees. "This is a very sensible strategy and a good discipline for growers to think ahead for what their requirements will be, while being mindful to keep plans reasonably flexible."

There's some confusion over exactly what growth stage crops have reached, highlighting the difficulty in correctly identifying leaf three emergence. Jonathan notes that the only way to tell is to cut open the plant and count the leaves back to the flag.

"Leaf three should be fully emerged on 50% of the main stems when you go in with the T1. Mistiming the application is always a danger, and if anything, it's best to err on the late side. But with yellow rust prevalent, it's

important not to extend intervals beyond three weeks. This season, however, I anticipate leaves will be emerging more rapidly as many crops will have been drilled late and will be catching up."

Herefordshire headaches

In Herefordshire, David Lines has concerns about how the COVID-19 lockdown will affect correct agronomy approaches this spring. "There's only so much monitoring you can replace with technology. For the most part, growers still rely on qualified agronomists walking their crops. This year, it'll be more important than ever that the right assessments are made," he notes.

"On some of our heavy clay, fields went like slop and crops are coming into the spring in a whole range of different conditions. Now the ground has gone from pudding to concrete and crops are struggling — that's when they're vulnerable to disease. The big quandary is which ones to cut back on and which warrant the spend."

The Bayer trial site at Callow was one of the casualties of the wet winter and was never drilled. So Jonathan and Bayer's Gareth Bubb have been (separately) to plots managed by ADAS at Hartpury College, which include an AHDB RL site. Drilled on 10 Oct, the soil is light but fertile.

"As you'd expect in this part of the world for that drilling date, there's septoria in everything — Elation is among the worst for it," reports Gareth. "There's also yellow rust in some varieties, such as RGT Wasabi. We're also seeing blotches on Graham and Shabras — it looks horrendous but it's not disease."

Jonathan believes this may be a variety-specific plant immune response, perhaps related to lock-up of trace elements in water-logged soils. He notes that Gravity has around 50% of the third last leaf to emerge covered in septoria lesions, but Theodore stands out as the cleanest, with just 5-10% of this leaf affected.

"There's very little escaping yellow rust with Spotlight badly affected. Overall, these are probably lower disease levels than we've seen in previous years, but every reason to get T0 and T1 sprays right," he adds.

David recalls 2011 — a similar year and one where the T1 spray actually proved to be the key application of the season. "Those lower leaves will contribute to yield. I'll be using the T0 to tidy up any yellow rust and protect crops that warrant it, but will focus on the T1. For an extra cost of around £6/ha for an SDHI-based spray over a robust alternative, I'd say it'll be an investment worth making in most cases and will also help on mildew that some of these stressed crops will be prone to."

Fiona notes that within that, growers will be carefully managing their use-up of CTL. "It has become part of the basket of risk this year."

Yorkshire trials

The final 'stop' on the tour is the Bayer trial site on silty sandy loam at the Stockbridge Technology Centre, Cawood, Yorks, where Adam Tidswell has made an assessment of plots that weren't drilled until 21 Nov. "The level of disease is generally low, which is not surprising given how late the crops were drilled," he reports.

"Yellow rust is active on susceptible varieties — JB Diego, Skyfall and Gleam — while septoria is confined to bottom leaves. There's some mildew, especially in barley, which is otherwise relatively clean,



Yellow rust, found in Sundance at Callow, needs to be brought under control — don't rely on adult resistance kicking in.

apart from rhynchosporium in KWS Cassia. There's no sign of eyespot, yet, not even on Sundance."

Adam shares photos of wheat and barley plants, taken on 27 March at around GS 23-25. "These look happy and healthy, compared with others we've seen today," notes Fiona.

"It's good to see some healthy-looking barley as I've seen Sept-drilled crops near me around Edinburgh that look poorer. It's important to keep them that way and that they hang onto their tillers, so the T1 spray will be the most important for winter barley."

With crops drilled this late now set to race through growth stages, Adam wonders whether it's worth skipping the T0 spray and going straight to the T1. "Whatever you do, get the T1 timing right," says Fiona. "My gut feeling is that there'll still be at least two weeks between each timing, and the job of the T0 spray is to stop any disease you have taking hold.

"Overall, I'm uncomfortable by the



Still at mid-tillering, samples of Barracuda (left) and KWS Orwell winter barley were healthy and happy at Callow.

amount of yellow rust I've seen today," she adds.

Jonathan agrees. "With yellow rust, the priority is to ensure there's no more than a 2-3 week gap between treatments as current races cycle every 10-12 days. But any yellow rust present needs to be brought under control — don't rely on adult resistance kicking in."

Adam plans to apply a T0 of a multisite with TEB at GS30, going back in at T1 with 1 l/ha Ascra. "I reckon the T1 will probably be a week later than normal."

Jonathan agrees there are plenty of crops that will warrant two SDHs this year, especially susceptible varieties drilled early. "What's more debatable is whether you need an SDHI at T1 for septoria on late-sown crops with good resistance."

Whatever your choice, plan it well, advises Fiona. "Use up your CTL early on, plan for resistance, don't rely on getting just-in-time delivery on products, and above all keep a close eye on crops — this is going to be a very difficult season to manage for so many reasons." ■

ALS resistance in bromes identified in the UK

Growers have been advised that brome control may need a rethink after herbicide resistance was found in the grassweed.

Research carried out by ADAS has identified one population of great brome, one of meadow brome and three populations of sterile brome resistant to ALS-inhibiting herbicides (mesosulfuron+ iodosulfuron and pyroxsulam). One population of rye brome 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 while it's non target-site resistance in the other brome species.

"The good news is that all brome populations tested were sensitive to propaquizafop, although resistance in sterile brome to this chemistry was identified in Germany in 2012," notes Dr Sarah Cook of ADAS.

What's more, all bromes tested were still controlled by 360g ai/ha of glyphosate although some populations showed increased tolerance at this rate. All populations were well controlled by 540g ai/ha of glyphosate — the recommended field rate for annual grassweeds.

"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," says Sarah. "But growers should be alert to the risk of rapid herbicide resistance evolution to other modes of action in UK bromes."

Compounding the problem is that the very

cultivation practices that help control blackgrass may open the door to brome. Shallow cultivation followed by direct drilling resulted in a marked increase in meadow brome to 20 panicles/m² in a rotational trial at Agrii's Stow Longa site. Areas of the trial which are ploughed or receive deep non-inversion tillage resulted in 0.5 panicles/m².

"When you think you have a system which is working against blackgrass, other problems arise," says Agrii's Colin Lloyd. "Fortunately, I think we have more cultural and chemical tools to control brome than blackgrass. So the priority is to use both against brome to prevent development of resistance."

Colin recommends a field-by-field approach to work out the best options. "Farmers will be looking to apply residual chemistry while they can to prevent any spring germination and possibly contact-acting as well. The tricky thing is, there may be late germinating weeds, including grassweeds this spring, so some people may try to hold back on the contact-acting herbicide until later in the spring," he says.

Bayer's Darren Adkins agrees that certain brome species seem to be more common as a result of blackgrass management. "In my area of Lincs and the East Midlands, blackgrass has caused lots of farmers to use a shallow tillage system. Use of post-emergence herbicides has also reduced and we're seeing increasing amounts of rye brome and meadow brome as a result."



Non target-site resistance to ALS herbicides has been identified in a population of great brome.

Darren believes there's no need to change up the autumn strategy if it's working for blackgrass, but brome needs to be kept in check so that it doesn't become more of a problem in years to come. "The threat of ALS resistance makes it doubly important to be proactive in managing brome to prevent it getting worse," he says.

With much less residual herbicide applied this season, growers will be relying on a contact-acting herbicide to control brome, susceptible blackgrass and other grassweeds, notes Darren.

"Identification is really important, especially for brome as different species have different germination patterns. This doesn't matter so much for spring herbicide programmes, but keep a record so it can be factored into your autumn cultivation strategy."