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Technical Disease control

Predicting the onset of septoria has always been a challenge because it's invisible during its latent phase. But a changing climate is possibly making fungicide decision-making even more difficult, CPM discovers.

By Lucy de la Pasture

Last year proved to be another season of unusual weather. March turned out to be the fifth wettest on record, yet April was one of the driest. In the lead up to spring there'd been below average rainfall for most areas but when rain arrived in May and June, septoria pressure rocketed and many growers were caught unawares.

That acceleration in septoria was recorded at the Bayer trials site at Callow in Herefordshire, where the company, with the help of Fera, is using some of the latest technology to register septoria DNA levels in the three leaves that contribute to yield in winter wheat.

“The aim has been to detect the disease within the leaf during its latent phase — when symptoms aren't visible — and look at the impact of variety resistance and drilling date on the build-up of disease,” explains Bayer's Jennie Watson.

First assessments were made on leaf two in Elation (AHDB Recommended List rating 4.3 for *Septoria tritici*), LG Motown (5.4) and LG Sundance (7.9), just ahead of T2 sprays on May 24. These revealed only untreated Elation carrying perceptible infection — this

The late show

being under 10pp/μl. When further assessments were made just 10 days later, septoria DNA had soared and untreated Elation came in at over 250pp/μl, with Motown a little further behind at 70pp/μl.

Driving the jump in inoculum was a series of rain events, says Jennie. “The Callow site lies in the shadow of the Brecon Beacons and usually gets its fair share of rainfall in most seasons, but after the dry start to the year there were some significant downpours — with over 10mm of rain falling on both May 10 and 12.”

Septoria severity

Jennie says it highlights just how quickly rain events can change septoria severity. “In the early spring, growers know their variety susceptibility and drilling dates, but when fungicide programme choices are being taken it's impossible to predict the weather to come.”

A few weeks earlier, the talk was of the lack of disease and trimming T1 rates, she points out. For Jennie, appropriate fungicide use is vital, which means good stewardship practices and adjusting rates to match disease severity.

“But growers must ensure product and dose are enough to give protection. No one could have predicted the rain from mid-May through to early June. After a mild winter we had strong crop biomass and septoria in the base of crops, but April dried it out.

“Our work shows if you have background septoria, it only needs rain events to kick it off. Over the past four years our spikes in the DNA have all come after repeated rain events,” she says.

Something similar was observed in 2017, this time at a Bayer-sponsored ADAS trial at Kingsbridge, Devon. In some areas spring rainfall had been just 10% of the quarterly

average and Kingsbridge was little different. Again, May rain changed everything. Leaf two assessments revealed low levels of the disease but by June it had soared, with untreated samples taken three weeks post GS39 revealing levels between 6000–10,000pp/μl.

The speed of acceleration in the levels of latent septoria in 2017 and 2019 caught both Fera and Bayer experts by surprise, says Jennie. “You have green leaves and feel happy that you're in a protective position then, out of nowhere, septoria symptoms appear on the leaf. The truth is that the disease was established in the plant in its latent phase and was beyond the stage where a fungicide can provide protection at the time of application.”

That's a good reason to pay close ▶



DNA testing last year has highlighted just how quickly septoria inoculum can build while in the latent phase, says Jennie Watson

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Bill Clark explains the length of the latent period is dependent on thermal time.

► attention to application timing, says Jennie. “When spores land or penetrate the leaf, they’re still sensitive to fungicides and applications at this time will protect leaf tissues. But once hyphae grow within the leaf, then even the most potent fungicides have little activity.”

Research has shown that septoria spores begin to germinate within 12 hours of landing on a leaf, and penetration occurs just 12 hours later. But it’s when the disease starts spreading within the leaf that is the crucial part and why growers may get caught unawares.

NIAB’s Bill Clark says that leaves may still look green, but the next generation of spores

is in production. “It’s thermal time that dictates how quickly we see symptoms on leaves. Typically the disease needs 220°C day degrees for symptoms to show, but how quickly this happens depends on thermal time. In warmer conditions symptoms could express themselves as quickly as 14 days, but it could be as long as 28 days in cooler conditions. During this time the fungus mycelia are spreading through the leaf leading to spores forming inside pycnidia.”

Varietal resistance

The Bayer work also assessed the value of varietal resistance, a key aim of the initiative. Bill notes that a number of factors affect the latent period. “Varietal resistance certainly is one of them, so the more resistant varieties tend to have longer latent periods, but we know very little about the mechanisms behind this.”

In 2017 it was found that after the T2 application some KWS Trinity (RL 5.3) samples had DNA concentrations 20 times higher than KWS Siskin (6.8). Last season assessments on leaf two taken on June 4 showed that in Elation, septoria DNA levels were three times that of Motown and significantly above Sundance.

According to Jennie the key benefit of



Leaf five showing higher levels of septoria on early versus later-drilled Graham.

varietal resistance is extending fungicide spray windows. “Obviously it depends on many factors such as drilling date, background risk and weather ahead of application, but clearly there is more leeway with a more resilient variety. It doesn’t necessarily change a fungicide programme but does allow growers to prioritise spray schedules by those varieties at greatest risk.”

Herefordshire agronomist and member of AICC, David Lines, says it’s important to be aware the headline data presented in the RL is an average. A more detailed look reveals that KWS Extase, the variety with the then highest level of septoria resistance on the RL

Consider bang for your buck

With an upturn in late-drilled winter wheat and more septoria resistant varieties in the ground this season, some will be questioning the need for expensive fungicide chemistry this spring. But ADAS cereal disease expert Jonathan Blake believes that value for money and risk management should be factored into fungicide choices made during the 2019 season.

Speaking at the recent Association of Independent Crop Consultants (AICC) annual technical conference near Towcester, Jonathan provided an update on the AHDB fungicide performance trials, including recently approved and pipeline products.

He said there’d been a clear fall in the performance of the SDHI co-formulations since 2017, with some differences between the products starting to emerge. In these trials a full label rate of Elatus Era (benzovindiflupyr+ prothioconazole) showed similar efficacy to 1.0 l/ha of chlorothalonil in 2019, falling some way behind the likes of Ascra Xpro, which was the best of the older SDHIs.

Corteva’s Qil fungicide active, Inatreq (fenpicoxamid), which will be sold in mixture with azole prothioconazole when it eventually gains approval, and BASF’s new azole-SDHI formulation Revystar (mefentrifluconazole+ fluxapyroxad),

were clearly in front for septoria control, explained Jonathan.

ADAS-inoculated, early sown trials using dirty variety Santiago put Inatreq under severe pressure in 2019 and the product performed very well. Revystar also offers similar activity on septoria to Opus (epoxiconazole) when it was first introduced in the 1990s.

With both likely to be priced at a premium, Jonathan said that some growers may be loathed to spend the money on this new chemistry at T2 in late-sown crops, perhaps opting to go with Librax (fluxapyroxad+ metconazole) or Ascra at the flag leaf timing. But he also pointed out that both new products are more active against septoria at half label rate than older alternatives at full rate, so this should be factored into fungicide plans.

“What really matters is how much it will cost to get similar efficacy from these new products. There’s a fair chance with the older chemistries that what you expect to get, and what you actually get, will be quite different because we’re seeing changes in the performance of SDHIs.”

With the newer product less likely to see a divergence in performance from the efficacy seen in trials, Jonathan added they could still be an option at T2 in late-drilled situations to manage risk.

“It will come down to price and how much



Jonathan Blake tells AICC members that the new fungicides are performing ahead of the rest, with some SDHIs showing a drop-off in performance last year.

punch you get for your pound in terms of efficacy relative to the older products,” he said.

Jonathan also touched on some older, but equally important chemistry which will be a hot topic of discussion this season as growers use up the last of their chlorothalonil.

He said multisite fungicide alternatives such as mancozeb and folpet will still have an important role in the future, particularly in protecting other chemistry from resistance and both offer activity in septoria.

In particular, folpet performed admirably under high pressure in 2019 and best results with the active are seen when used in a tank mix at T2.

“Over three years of trials we have also seen that folpet works particularly well with Inatreq,” he noted.

at 8.1, has a large variation in yield response across trials sites.

“Extase has a much wider range than other septoria resistant varieties, such as Graham (6.8), Siskin (6.8), Theodore (8.2) or Sundance (7.9) when it comes to response to fungicides. So under favourable conditions, it will still get septoria, in spite of its relatively high resistance.”

Illustrating the point, David describes one farm last season where Extase had been planted in Sept and just romped away in the spring. “At T1 the crop had quite high levels of septoria and needed a robust T1. The levels of disease reflected its early growth and high biomass production, but the varietal resistance kicked in later and we were able to pull back a bit on the rate of Ascra XPro (prothioconazole+ bixafen+ fluopyram) at T2.

The research reinforced David’s point and highlighted the benefits of later drilling. Just before the T2 fungicide timing, leaf two samples were taken from KWS Trinity, drilled on 22 Sept 2017, and 10 days later showed huge differences in DNA measurements.

In 2019 comparisons between Callow plots drilled on Oct 8 and those at Hinton Waldrist, Oxon drilled on Oct 27 also revealed big differences. “The weather played a part, as Callow did get higher rainfall, but all six trial varieties carried more septoria at the Callow site than those at Hinton Waldrist,” notes Jennie. “With some varieties, we recorded a ten-fold increase in infection on leaves two and three between the two sites.”

This season Bayer will be extending its DNA assessments by testing more regularly throughout the season. Eventually such technology will make its way into commercial farming, which Jennie welcomes.

“Couple DNA testing with weather and spore trapping technology and you’re getting a very accurate picture of the disease threat. It means knowing more than whether you’re in a protective or curative



Being able to track septoria inoculum in its latent phase would enable agronomists to time fungicides better and recommend appropriate rates to give the best control of septoria.

position. Rates can be adjusted more accurately to reflect variety, drilling date and weather patterns.”

David agrees that a rapid test for latent septoria would help aid decision-making in the field. “At the moment fungicide decisions are based on variety information, which is known; the levels of disease within the field, which doesn’t account for latent septoria; and future weather patterns, which is a best guess.

“Knowing the level of latent infection would inform and justify both the product choice and rate at which to use it. The importance of this is highlighted by the Bayer SpotCheck work in OSR, where light leaf spot has consistently been confirmed by DNA testing samples where no symptoms were identified in the field,” he says.

There’s also a resistance management



David Lines points out that even a septoria-resistant variety like KWS Extase will still get septoria, especially if it’s early drilled.

angle to selecting the appropriate effective dose of fungicide, adds Jennie. “A product like Ascra has dose versatility as it can be used at rates from 1.0-1.5 l/ha. If excessive fungicide use is avoided it not only helps protect chemistry but farm margins too,” she concludes. ■

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