

Signalling a breakdown

“All measures of IPM will be important when growing these varieties.”

Technical Varieties

Signals are starting to indicate a potential breakdown of septoria resistance in varieties with Cougar parentage. CPM takes a look at the evidence to date.

By Charlotte Cunningham and Lucy De La Pasture

Just like a winning line-up at Crufts, if you look at the parentage of some of the top UK wheat varieties, there are one or two names which repeatedly crop up.

And among those is Cougar. The variety itself was recommended in 2015, spawning from the RAGT stable, and was marketed with the tagline 'big cat wheat yields are here'.

And as well as its table-topping yields, Cougar also boasted outstanding septoria resistance.

Together, this combination made for a highly sought-after variety, which naturally meant it was an ideal parent for future breeding lines.

Though Cougar has proven itself to be

just that, over the past few months, CPM has been aware of anecdotal evidence to suggest that some varieties containing the Cougar septoria resistance gene are starting to see a breakdown in robustness.

And now, AHDB are starting to see similar patterns emerging too.

The levy board recently held an open day at Saaten Union where it gave an update on the current Cougar/septoria picture.

Changes to septoria

"As a trial inspector, I've been looking at a lot of the varieties here in Cowlinge as well as the South West, East and North East, and while generally crops have been looking good, over the past few weeks diseases have been coming in and we're seeing changes to septoria," says AHDB's Mark Bollebakker. "This is particularly the case in the soft wheats, where we're seeing varieties which have Cougar as a parent showing signs of a lot more septoria than their ratings would suggest.

"The five new varieties, LG Prince, LG Illuminate, LG Quasar, Merit and LG Astronomer — which all have a Cougar parent — currently all have a septoria rating of 7, but we think this will change. We don't know for certain yet where they are going to end up, as this has only started to show prevalently over the past few weeks."

Mark adds that this doesn't just relate to the new Group 3s, but also other varieties on the RL which have a Cougar pedigree. "These include popular varieties like KWS Firefly and RGT Saki. Then there is also Swallow, but that is only recommended for the North, and I haven't seen much of that yet.

"The advice is that we know it's happening so keep an eye on your crops and we'll wait for the data from harvest



AHDB says it is starting to see evidence of Cougar cross varieties showing less resistance to septoria than their ratings would suggest.

and do a rating adjustment if necessary.”

It was also a topic of discussion at this year's Cereals event.

Speaking at a seminar in the AHDB theatre, AHDB's field trials senior manager Sean Burns, said that during the time Cougar was in production an isolate was identified — known as the Cougar variant — which was assessed by the UK Cereal Pathogen Virulence Survey as a one-off, but at the time it wasn't thought to be significant.

Detailed assessments

“We're making detailed assessments within our trials at the moment. Normally we look at disease ratings based on a three-year data set, but depending on what we get back, we can make an adjustment based on a one-year set.

“At the moment, it's a bit of a watch and see, but what we can say at this point is that not all varieties with a Cougar background are affected in the same way.”

AHDB says it first noted the shift in resistance in RL trials in Devon, which is similar to what was seen in Ireland in 2020.

And across the water, The British Society for Plant Pathology (BSPP) has been looking into this, with a study on the detection of virulence to septoria resistance conferred by the cultivar, Cougar, in the Irish *Zymoseptoria tritici* population.

In late summer 2020, foci of septoria were observed across a range of winter wheat cultivars under evaluation for recommendation in Ireland. Common amongst these was the cultivar Cougar in each of their pedigrees.

To determine if the foci observed resulted from strains virulent to Cougar, isolate

Encouraging diversity reduces risk for both farmers and breeders, says Ed Flatman.

collections were established, and virulence screens conducted on Cougar and a range of the cultivars currently under evaluation.

These confirmed the presence of Cougar-virulent strains in the Irish *Z. tritici* population, and that this virulence affects not just Cougar, but also cultivars derived from it.

Although the foci were found in both untreated and treated plots, there was no evidence that these strains are more sensitive or resistant to fungicides compared with the wider Irish *Z. tritici* population, with moderate resistance to the SDHIs and azoles dominating.

Combined, the present study confirmed ▶



Sean Burns says trial inspectors are making assessments at the moment, with adjustments to official ratings an option if necessary.

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Will Compson says it's not yet clear if this race is influenced by this season's weather or if it's here to stay.

► the need to ensure a diversity of control measures for septoria, including ensuring a range of resistance gene are used.

Cereal pathologist, Steven Kildea, headed up the study and tweeted in relation to the findings: "Briefly in the late summer of 2020, some very nasty foci of septoria were observed across a range of candidate varieties in the Irish RL wheat

trials, with Cougar among them.

"We isolated, confirmed virulence of the strains to Cougar, with very specific reactions — dead or green.

"We looked at a panel of varieties — with and without Cougar parentage — with specific reaction identified. Clearly, those with Cougar in the background and relying on it for septoria resistance were affected. Other resistant varieties without Cougar were not impacted.

Reducing risk

"As for 2021, unfortunately virulence to Cougar-based resistance is here with serious levels of septoria now present in some sites and on various varieties who rely on it (Cougar) for septoria resistance. All measures of IPM will be important when growing these varieties."

So as the evidence starts to mount up, what do the breeders have to say?

Limagrain's Ed Flatman says that although a lot of its varieties feature a Cougar pedigree, it's not the major — nor the only — resistance within the breeding programme.

"We're doing a lot of work to ensure resistance to septoria is based on multiple strains and genes of resistance. Encouraging diversity reduces risk for



The BSPP recently published the findings of a study on the detection of virulence to septoria tritici blotch resistance conferred by the cultivar, Cougar.

both farmers and us as breeders."

However, Ed does acknowledge the challenges coming through with Cougar-cross varieties. "We're seeing a shift in resistance — but that is varying significantly between the individual varieties.

"The advice from me is not to put your entire farm into one related group or into

New options this autumn

And while the investigation into the potential issues with Cougar continues, there are plenty of other robust varieties available to growers ahead of the autumn drilling window, with both RAGT and Limagrain recently putting on open days to showcase the latest developments in plant breeding.

For RAGT, RGT Wolverine is in the spotlight — which is claimed to be Europe's first winter wheat with resistance to barley yellow dwarf virus.

Speaking at the event, the firm's Tom Dummett says it's clear to see from trials and field experience that the variety offers cost-effective, season-long protection against BYDV. "That's very good news for growers. It's estimated that 82% of the wheat crop area is at risk from BYDV. Yield losses in untreated crops average 8% but can reach 60%.

"But the withdrawal of neonicotinoid seed treatments has had a significant impact on BYDV management for the past couple of seasons, leaving pyrethroid insecticides as the only remaining chemical option to control the aphid vectors."

In terms of cost and return on investment, RGT says that assuming a seed rate of 175kg/ha, the resistance trait costs around £15/ha.

"That is exceptional value for money, especially when you consider that neonicotinoid seed treatments, which were widely used, had been costing farmers about £23/ha for six weeks' control," adds Tom.

"This was often followed by a pyrethroid to extend protection by a week or two. Including application costs, that added a further £17/ha, taking the total to £40/ha."

And at Limagrain's Rothwell site in Lincolnshire, two new Group 4 candidate hard varieties, LG Farrier and LG Typhoon, are looking promising.

According to Ron Granger, LG Farrier has consistently high yields, and a good resistance profile for mildew and rusts, while LG Typhoon has potentially one of the highest septoria resistance scores, and fits across wide drilling windows, including earlier drilling.

Group 1 milling wheat, Crusoe, remains very popular with both millers and farmers, and is holding up well agronomically too, he adds.

"In the second half of June, even the untreated Crusoe generally looked green and healthy, with the promise of a good crop this year.

"It has high protein, good quality grain and a stable Hagberg, alongside an excellent disease package that includes a 9 for yellow rust — which



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has held up well despite the changing pathogens."

The breeder is working to develop the next generation Crusoe, and the variety will also be used as a parent to convey the best of its genes.

varieties with the same resistance genes. Look for diversity to minimise risk.”

KWS' Will Compson says he hopes the firm will learn more about the prevalent strain as the season progresses. “This year we are seeing prevalence of a strain of septoria that has been seen in Ireland previously, and may have made its way here.

“While the information is still a bit sketchy, from what we've

seen and heard, some varieties that are expected to have very good septoria resistance are instead getting some disease to a moderate level — which should still be manageable with a robust fungicide approach.

“It's not yet clear if this race is influenced by this season's weather or if it is here to stay, but these Cougar-cross varieties may well need a more robust program going forward.” ■

Funding new genetics

To help growers access new genetics to improve their crop performance, the Royalty Area Collection Scheme (RAC) was set up by a group of breeders. It provides an easy way for growers to pay for new breeding which can improve their crop management and profitability, explains James Wallace of Breeders Intellectual Property Office (BIPO).

“The RAC scheme also provides crop traceability for specialist food processors, opening up premium markets for their growers. With the withdrawal of pesticide active ingredients, especially insecticides, there's a requirement for genetic disease resistance traits to be introduced into varieties so growers can maintain farm yields,” he says.

The scheme helps encourage breeders to identify and develop disease resistance traits and combine them with the other key features, such as yield, standing ability and quality to make a variety successful on farm, highlights James.

“This requires investment in time and in people and, like any business, breeders will do so when they know their success will be rewarded in the market.”

For disease resistant varieties marketed using the Royalty Area Collection Scheme, growers agree to pay a royalty on the hectare of the crop they grow. “It means they have a known cost per hectare for the disease resistance of their crop, which can be compared with other methods,” he says.

By providing breeders with the potential for a fair return on their investment, the RAC scheme incentivises breeders to invest in identifying traits which will most benefit growers. Examples of varieties using the RAC scheme are RGT Wolverine winter wheat and Sensation and Idilic winter barley — which provide BYDV resistance and remove the requirement for aphicide applications.

“Processors producing premium food products rely on traceability of their ingredients to assure customers of their quality. Quakers with their Conwy spring oat contracts and exporters of Sakura marrowfat peas to Japanese Wasabi pea processors also use the RAC scheme to ensure traceability of their supplies.”

The RAC scheme was introduced ten years ago and is now well established, with a range of premium varieties listed. Most growers register and provide declarations using the BIPO online system, explains James.

“This designed to be user-friendly and only takes a few minutes to complete. Alternatively, registration forms can be downloaded or provided by seed merchants and returned through the post.”

For anyone intending to grow varieties using the RAC Scheme they can find out more information and register through the BIPO website — www.bipo.org.uk



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