



## Africa less rusty on rust?

**As the UKCPVS meeting wrapped up earlier this month, someone asked me 'well, how are you going to write that up then?' With no headline-grabbing changes in any of the pathogen populations within last year's survey I was asking myself the same question.**

But in actual fact there's some exciting, really ground-breaking stuff going on around the peripheries of the UKCPVS. Not least is the MARPLE project, in which the John Innes Centre is a partner, where they're bringing mobile diagnostics and surveillance for yellow rust to growers in Ethiopia.

Researchers have developed a device which can fit into a hard case that's able to sequence specific regions of the pathogen's genome and define individual strains of yellow rust. But that's not the limit of its capability. The device can be used to monitor key genes for mutations, such as fungicide target genes.

There seems to be some irony that farmers in Ethiopia have access to technology which isn't currently employed within the UK. At the moment

our pathogen surveillance work provides results which give a retrospective look at what's happened in the past season, not what's actually going on in the crops in the here and now.

The meeting also discussed whether spore trapping, which is increasingly being used to monitor and forecast disease is of any particular benefit with yellow rust. The consensus was that the yellow rust spores sampled from the air will contain a cocktail of the many different pathotypes, so while spore trapping may be of use to monitor total spore levels of the disease, even if their genotypes are analysed, the results are unlikely to correlate closely with the pathotypes which may be blown into a crop and cause yellow rust infection.

In 2015, unexpected septoria was reported in some wheat crops in late season — known as the Cougar outbreak because of the variety affected, which had a resistance score of 7 on the AHDB Recommended List at that time. This new variant was investigated in a two-year AHDB-funded project and the results presented at the UKCPVS meeting.

The conclusion from the research was that there was not much risk from the Cougar variant of septoria to any varieties other than Cougar and its genetic derivatives, though there were very variable patterns of virulence seen. Reassuringly, when the variant was genotyped and put through resistance testing, the isolates were shown to be normal, with no differences to the majority of the pathogen population other than in virulence.

With septoria the number one disease in UK wheat and more and more reliance been

placed on resistance in varieties to aid its control, it was alarming to hear that, in the main, researchers have no understanding of virulence changes in the septoria population. There's obviously a pretty significant cost element to adding septoria to the UKCPVS remit but perhaps it's time to consider the possibility?

If the genetic wizards at John Innes can produce a mobile device to monitor strains of yellow rust, then could they do the same for septoria and monitor for fungicide target site mutations at the same time. That would be useful, near real-time information to aid disease management at the coal-face.

It may be mind-boggling stuff but understanding the interaction of the host and pathogen at the level of the genome is crucial stuff. This is how we'll learn how to outwit the pathogen without having to resort to extensive fungicide use and one day this will be possible.

In the meantime, the lack of any dramatic changes doesn't mean there won't be a new incursion of yellow rust this year. Anything could happen. There are some nasty yellow rust pathotypes within Europe which may or may not appear in the UK with the passage of time.

Sending in samples is key as the UKCPVS relies on this to pick out the newcomers, particularly where infection is unexpected because of a variety's resistance rating. For me, the intensive sampling of yellow rust research (see p8) was a stark reminder that the surveillance data is just a snapshot of what's going on in the crop. New genotypes are constantly emerging — it really is a race to keep up!

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*Farmers in Ethiopia have access to real-time surveillance and sequencing of the yellow rust genotypes.*

