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BBRO Spot Check

After 2020 and the devastating outbreak of Cercospora in many crops, the spotlight has been very much on this foliar disease in 2021. Our experience from last season and the two key messages from other countries where Cercospora is more established, clearly show that 1) monitoring of the weather conditions for the risk of Cercospora development and 2) the early identification of symptoms in crops are key. This allows early and appropriate fungicide treatment, which is vital in keeping ahead of the disease and keeping it in check.

It is with some trepidation that we write this article at the end of July, as we don't know what is ahead of us, and how the situation might change! However, to date our monitoring of weather conditions has not triggered any warnings of high Cercospora risk and there have been only isolated reports of very low levels of Cercospora symptoms in crops. Growers are starting their fungicide programmes as the first symptoms of other foliar diseases such as powdery mildew are being found. Crop canopies are generally looking very healthy and although the hot weather is causing some wilting on lighter land, we are in a good position with regards to foliar diseases to date. As the season progresses, we can expect crop canopies to come under higher disease pressure and we therefore need to keep one step ahead.

Here are a few pointers to help us ensure we keep a keen focus on symptom recognition and identifying high risk periods.

During June and July, we experienced a lot of 'Cercospora-like' symptoms in crops and received a lot of calls, photos, and samples from concerned growers and agronomists. The symptoms were in fact bacterial leaf spot, a consequence of the cool wet conditions earlier on in the season. This is an early season disease and rarely do we see this as the seasons progresses.

Fig. 1-3. Developing bacterial leaf spot symptoms in the early part of 2021

Bacterial leaf spot

An early season disease encouraged by cool and wet conditions. Characteristically, more ragged irregular spots than cercospora with black borders, usually developing into large area of leaf necrosis, often at leaf margins and associated with leaf yellowing. Remember that this is caused by a bacterium, so fungicides will not be effective.

As the season progresses and especially as temperatures increase, we expect to see more fungal diseases in the crop, many of which have symptoms that can share some similarities with Cercospora leaf spot. Here is a quick reference guide to these:

Cercospora leaf spot

From late July onwards, very rarely seen in UK previously as high humidity (>90% RH) and high temperatures above 24/25°C are required for significant infection to occur. Early infection is characterised by many regular circle shaped spots with reddish-brown margins and tan-grey centres. Black stromata (spore bearing structures) which can look like black pepper grains form in humid conditions, and these are the sources of further infection. Under favourable conditions, leaf spots spread rapidly and coalesce across the leaf, often causing the whole leaf to be infected, wither and senesce.

Fig. 4-6. Developing symptoms of Cercospora leaf spot

Fig. 7. Close up of a single Cercospora leaf spot received at the Plant Clinic in July. Under humid conditions, black dots form in the centre which produce spores for further infection. Photo by Dr Kate Orman

Ramularia

This is a disease that can cause 'spot-like' symptoms. The disease usually occurs mid to late autumn and prefers cooler (17-20°C) temperatures unlike cercospora's preference of wet and humid conditions. The leaf spots are usually larger and more angular than cercospora and tend to be more brown/light grey in colour. Small white conidphores (spore-bearing) develop when sporulating compared to the black conidiphores of cercospora. These will be just visible under a hands-len. Ramularia rarely has a signifcant effect on yield

Fig. 8. Ramularia symptoms

Phoma and Alternaria

Two further diseases which can cause spots or lesions on leaves are Alternaria leaf spot and Phoma. Both of these tend to infect crops later in the season and tend to be saprohytic, appearing on older leaves, especially at the leaf margin and on leaves which are sensescing or have already been damaged or infected by another disease/virus. We experienced quite a lot of Alternaria last year 'on the back of virus yellows infection' some of which was probably incorrectly thought to be cercospora. Alternaria tends not to produce lots of small regular circular spots but typically more angular areas of necrosis with lots of associated leaf yellowing. Phoma leaf spot, prefers warm conditions (20°C) and spots are much larger than single cercospora spots, typically with concentric rings. The spot often splits at the centre. Sometimes light black granules can be observed within the spots. Phoma tends to be an occasional disease in UK beet crops, and like Alternaria often is more prevalent where there is other disease or virus infection already established.

Fig. 9. Alternaria symptoms

Fig. 10. Phoma symptoms

Avoiding a blind spot

Throughout 2021 we have been monitoring weather conditions closely via the Sencrop network and the Weatherquest data to identify any high risk periods when conditions have become or are forecasted to be favourable for the rapid development of Cercospora.

In general terms, this is when there is more than 90% humidity for > 10 hours in day and the average temperature is above 24/25°C. We should remember that as conditions change, this does not switch the disease on or off but simply affects the rate of disease development. Don't assume you won't see symptoms if there have been no high risk periods reported.

Fig. 11. Sencrop sensor detecting leaf wetness

Whilst we have had some high temperatures and humidities (end of July), the two have not generally occurred together for long enough to trigger a high risk. The graph in Fig 8 shows the typical daily trend in humidity and warm temperatures in July. Peak humdity (>90%) occurs early morning and as the temperature increases and the crop dries out, this declines fairly rapidly by mid-morning. This sensor was near to King's Lynn and has a special sensor placed in the canopy. The sensor also measures leaf wetness and although the Cercospora risk model does not use this in the calculation of daily infection values, it does provde a useful cross-check on risk.

Figs. 12 & 13. Typical daily trend in humidity, temperature and leaf wetness on a hot July day

Leaf wetness or free moisture is usually a consequence of condensation or rain (sometimes fog) on the leaf surface. It is when the period that the leaf is recorded as wet exceeds more than 10 hours (600 minutes) per 24 hour period, that the crop is considered to be at high risk. There is some scientific reports that suggest that leaf wetness maybe a more accurate indicator of risk. By measuring this is 2021, we may be able to validate this under UK conditions.

As the season progresses and throughout the harvesting campaign it is important to keep in touch with the Cercospora risk as this may determine the need for either a further fungicide or a change to the length of interval required between sprays. Don't create a blind spot on Cercospora.

More information on Cercospora and the current risk is available on the BBRO website https://bbro.co.uk/on-farm/cercospora-risk/