

Wheat Disease Update – 27 March 2020
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Over the past 7 to 10 days, multiple photos and samples have come to the lab describing wheat fields with yellowing of older/lower wheat leaves, which occasionally has spread to a lesser extent to younger/higher leaves. The first reaction to this is that these symptoms are the result of leaf spot diseases such as tan spot, *Septoria* leaf blotch, and *Stagonospora nodorum* blotch. Although that often is an accurate diagnosis, in some of these cases I have not been able to isolate the pathogens that cause these diseases. What follows is my best explanation for this.

First, yellowing and leaf death is the result of natural senescence of the older leaves that then are colonized by saprophytic fungi that lead to a mottling appearance in the leaves. That is what I believe happened in the sample represented by photos in Figure 1 (photos from Brooke King). Notice the leaves in the white boxes in the photo on the left. These leaves have dead tissue that appears quite “old” and has been colonized by saprophytic fungi that add to the mottled appearance of the leaves as can be seen more clearly in the center photo. A few of these leaves you can see in Figure 1 also have a general yellowing that indicates the leaf is dying and will be colonized by saprophytic organisms including fungi that live only on the dead tissue and do not cause leaf spotting diseases. I have not been able to isolate pathogenic fungi from leaf samples such as this, and therefore surmise that abiotic factors such as temperature and soil wetness contributed to the leaf yellowing that then led to colonization by saprophytic fungi and other organisms. Another factor often present in such cases is that there is no or only minimal wheat residue in these fields. Lack of wheat residue indicates there should be no or very little inoculum of the fungi that cause the leaf spotting diseases mentioned earlier, which indicates that leaf spot diseases are not involved.

Figure 1. Yellowing and dying of lower leaves most likely the result of leaf senescence followed by colonization of the dead tissue by saprophytic fungi. (photo credit: Brooke King)



At the other end of the spectrum, are samples that have come in such as those in Figure 2 (Zack Meyer, FMC). In Figure 2, the leaf in the white box in the photo on the left is typical of tan spot. Also note the presence of heavy wheat straw residue on the ground and the presence of the black fruiting bodies of the fungus that causes tan spot on the straw residue (photo on the right).

Figure 2. Leaf yellowing and spotting in a wheat field that definitely fits the pattern of tan spot.



Other photos of leaves showing primarily tan spot have been sent in by Gary Strickland (County Educator; Jackson County) in southwestern OK (Figure 3 – photo on the left). It is likely that *Septoria* leaf blotch also is present in these samples represented in Figures 2 and 3, and in fact in the photos submitted by Zack Meyer, *Septoria* is present on one of the leaves as shown in the photo on the right in Figure 3. Note that leaf spots such as this are not visible in the photos in Figure 1. That's not to say there are absolutely no leaf spots present in sample 1, just not as anywhere near the frequency as in photos in Figures 2 and 3.

Figure 3. Wheat leaves showing typical symptoms of tan spot (photo on left from Gary Strickland), and a leaf showing a lesion typical of Septoria leaf blotch (photo on the right from Zack Meyer, FMC).



So, in summary, leaf spotting diseases are making their presence felt in Oklahoma, which is not surprising given the temperature and moisture we have been experiencing. This is especially true in no-till, wheat-following-wheat fields where abundant wheat straw residue is present. This also could be occurring in conventional tilled fields that are wheat after wheat where there still is wheat residue present. However, in fields where wheat residue is not present, I believe the yellowing and spotting is most likely due to abiotic conditions that led to leaf senescence followed by colonization by saprophytic fungi, or other fungi that are weakly pathogenic. Only in cases where I can isolate the causal pathogen can I say that a certain disease is involved. In cases where I cannot isolate a pathogen, then I have to look at abiotic causes. In fields where leaf spotting diseases are present, an early application of a fungicide should help to manage leaf spot diseases as well as powdery mildew and stripe rust, but a second application may be needed later to help manage leaf rust and possibly stripe rust.

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