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Sunflower rust is not unusual in itself, but it is surprising to see it this early in the season. And at the levels that have been reported so far. This rust has the potential for significant economic yield losses to sunflower. Considering the current high-price structure, growers will want to protect their significant investment in the crop and their income potential in the field.

What follows below is helpful information regarding sunflower rust from Sam Markell, Extension Plant Pathologist at NDSU.

There are currently two fungicides labeled for rust control on sunflower, Headline® and Quadris®. Fungicide application, of course, is based on the level of infection as determined by the leaf area covered with rust pustules. An additional posting here shows illustrations to help you determine infection levels in your fields. Pay special attention to areas of the field adjacent to last year's sunflower fields or areas of wild sunflower, as they may be the original source of infection. Consider tank mixing an insecticide for bud moth, thistle caterpillar and other early emerging head/seed damaging insects, if you're going to apply fungicide for rust control.

Please don't hesitate to contact us with questions about sunflower rust, or any other production issues you may have.

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Early Appearance of Sunflower Rust is a Cause for Concern in North Dakota

By Sam Markell, Extension Plant Pathologist, samuel.markell@ndsu.edu

Sunflower rust is a disease that is capable of causing significant yield loss to sunflowers. Sunflower rust appears most years in North Dakota, but usually isn't observed until late July or early August. However, the presence of sunflower rust in North Dakota was recently brought to my attention by Crop Consultant Mike Hutter (Renville County), and the disease has since been observed in other counties throughout the state.

Symptoms. Rust will often initially appear on the lower leaves and spread upward as new leaves are produced. The disease produces small (approximately 1/16 inch) dusty cinnamon-brown pustules full of brown spores (Figure 1). Brushing your thumb across rust pustules will have a dusty brown streak on it. Rust can also infect the stems, bracts, and head.

Disease Cycle. Once pustules are observed, they each are capable of producing many more spores, and many cycles of infection. These spores can be dispersed long distances by wind, which may rapidly spread the disease to other fields. Spores need a minimum of 2-3 hours of free water (either dew or rainfall) to germinate, but 6-10 hours of free moisture will produce higher levels of germination and infection. Optimal temperature for infection ranges from 60-75 degrees Fahrenheit, but can occur between 39 and 86 degrees. At temperatures above 90 F, rust spores do not germinate on sunflowers. Once infection occurs, temperature is the only environmental factor that will determine how fast the disease progresses. During cool conditions (65 F day/55 F night) it may take up to 14 days for new pustules to form, but at warm conditions (85 F / 75 F) new pustules can be formed in as few as 8 days. Thus, warm temperatures will often speed disease development.

Fungicides. We have almost no fungicide data from early rust epidemics, simply because they are rare. However, after conversations with colleagues in other sunflower growing states and provinces, I would recommend being aggressive controlling this disease. We have a long growing season in front of us, the disease is well-known to cause yield and quality losses, and the price of sunflowers is high enough to justify managing the disease. I think it is important to scout your fields weekly for the disease, and use the accompanying diagrams to help assess severity (*see "rust diagrams" pdf*). In fields where rust is not found, be happy, and scout again next week. In fields where rust is found, you likely need to consider a fungicide application this season.

Currently, Headline® and Quadris® are labeled for rust control. If rust is absent or present at very low levels, it may be prudent to wait until the upper leaves have emerged. However, if severity on the lower leaves is higher (3%-5% or more average for all leaves) and favorable conditions for disease exist (prolonged dew and relatively warm days), a fungicide application to arrest the development of the disease may be warranted. In this case, a follow-up application could be necessary later, depending on severity and growth stage. Headline is labeled at 6 – 12 oz/A and Quadris has a North Dakota Section 2(ee) label at 6 - 7 oz/A, but both disease control and residual will be better if a higher rate of either product is applied (9 oz or more for Headline). Remember to read the label, follow directions, and pay attention to the PHI.

In some fields, a threshold model for rust control developed by researchers in Israel in the mid 1990's may be useful, with some modifications. The model is based off fungicide timings around flowering, so it may be relevant in some areas. The research group found that yield loss was limited if a fungicide application was made when the upper four leaves had an average coverage of 3% pustules (see diagrams). They also found that at 27 days after flowering, a fungicide application no longer benefited the crop, since the seed filling period was largely finished. However, two things about this study suggest to me that we might want to be more aggressive than this. First, this data was based on an application of a triazole fungicide (Folicur; which is not labeled on sunflower), which has been shown to have more curative activity than strobilurins (Headline and Quadris) on rusts of other crops (strobilurins should be viewed more as a protectant for sunflower rust). Thus, an application **before the 3% severity threshold** is reached is critical when using the strobilurins, and I would strongly encourage the use of a higher application rate. Second, we should expect our climate to be more conducive to disease development; further suggesting that an application before the 3% severity threshold is reached would be prudent.

If rust is in your area and you are considering a preventative application, I would recommend waiting until early flowering. That way you protect the upper leaves for a prolonged period of time, removing much of the window for new infections to cause damage.