Cool Bean Advisor

UNIVERSITY OF WISCONSIN AGRONOMY, SOYBEAN RESEARCH, UNIVERSITY OF WISCONSIN-EXTENSION

Weather Conditions and Risk of White Mold in Soybean

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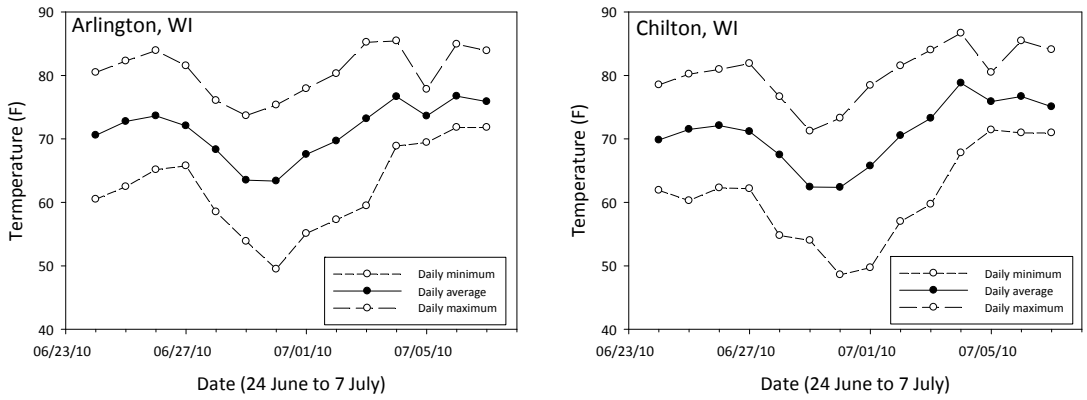
As we have moved into the early flowering growth stages in soybean, we continue to receive numerous questions about the risk of white mold in soybean. Currently, there is not a reliable disease forecasting system for predicting the risk of white mold, however, several environmental factors can be considered to determine risk at or around flowering. In this article, we will discuss specific factors like air temperature, rainfall and soil moisture, and leaf wetness, and how they all correlate with the risk of white mold.

In Fig. 1, we present air temperature data for the period 24 June to 7 July. These data were obtained from weather stations we have established at several of our research trial locations. Air temperature < 85F is one environmental variable that we monitor since cool temperatures are more favorable for white mold occurrence. To illustrate for the two week period, at Arlington, there were only two days where air temperatures were > 85F, the 3rd and 4th, and this was for only 0.25 and 0.5 hours on those days, respectively. At Chilton, the 4th and 6th had temperatures > 85F for 4.75 and 0.5 hours, respectively; for Janesville, the 26th (1), 3rd (1), 4th (3.25), 6th (1), and 7th (3.75); for Lancaster, the 26th (1) and 3rd (2.25). Overall, temperatures during this period were in the favorable range for white mold infection to occur.



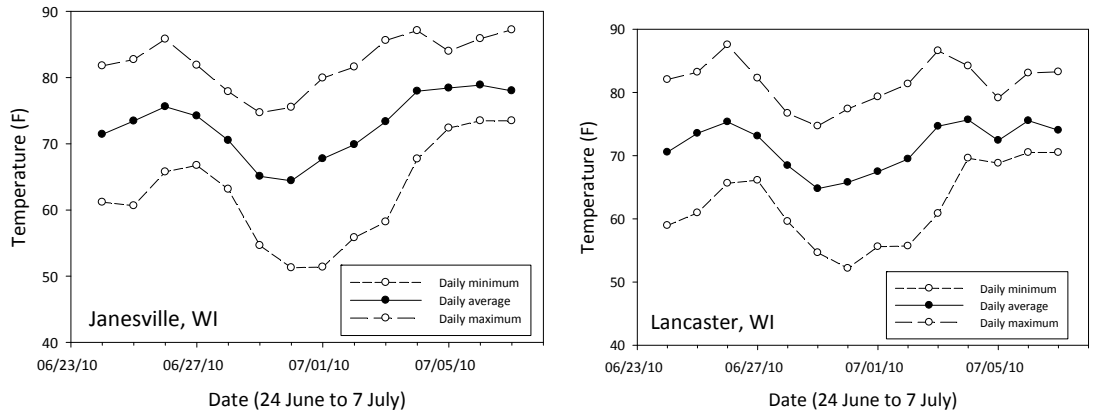


Fig. 1. Daily minimum, average, and maximum temperatures for Arlington, Chilton, Janesville, and Lancaster, WI for the period 24 June to 7 July 2010.

The risk of white mold is also increased by normal to above normal rainfall and soil moisture that is at or above field capacity. In Fig. 2 the plots show daily rainfall (in inches) and the volumetric soil water content (m^3/m^3) at the same four locations. More rainfall was observed at Arlington and Lancaster, which correlates well with higher soil water content levels. While less rainfall was observed at Janesville, soil moisture conditions have been high throughout the growing season with only recently have we seen a decrease in levels. At Chilton, conditions are much drier. This suggests that conditions are more favorable in the southern portions of the state for white mold.

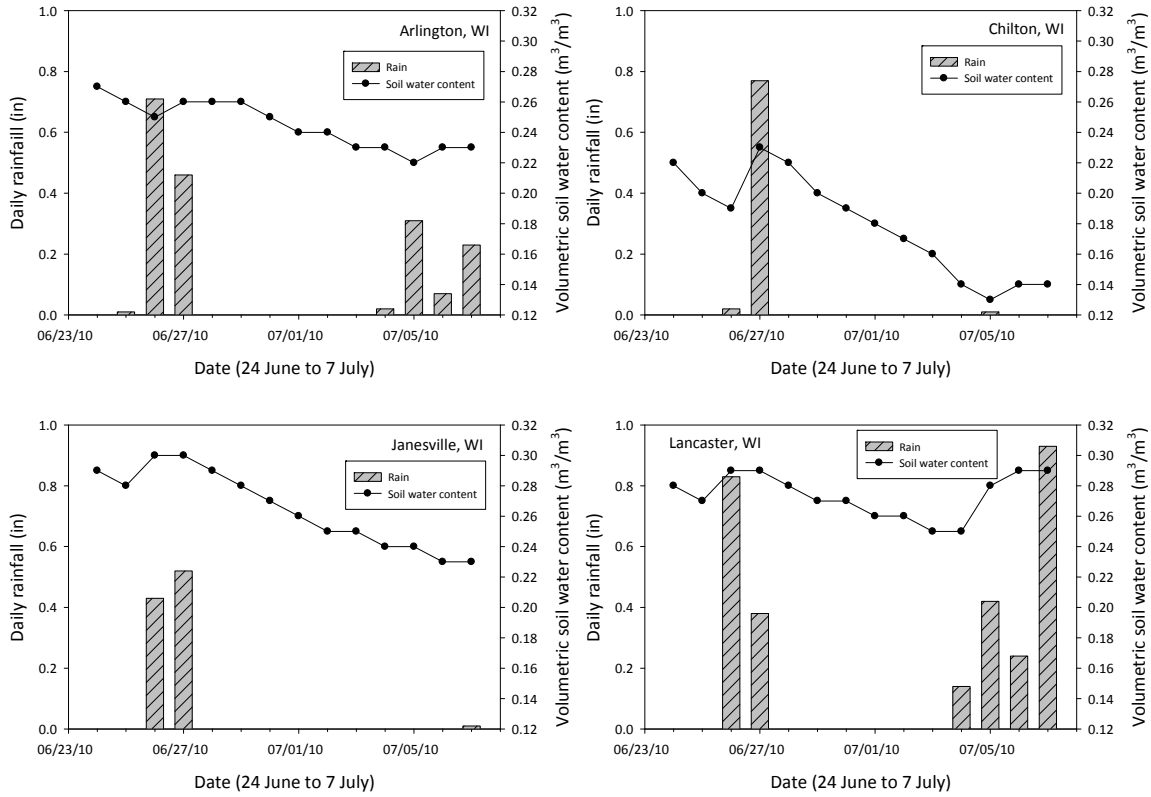


Fig. 2. Daily rainfall (in) and volumetric soil water content (m^3/m^3) for the period 24 June to 7 July for Arlington, Chilton, Janesville, and Lancaster, WI.

Another factor that can be considered is leaf wetness, an indicator of high canopy humidity. At each of our sites, two leaf wetness sensors are mounted, one at 30” and one at 48”. In Fig. 3 daily summaries are

presented for the number of hours of leaf wetness beyond two arbitrarily selected thresholds (50% and 75% leaf wetness, respectively) and the daily summaries are based on measurements from midnight to 11:45 PM each day. While these sensors are currently at a height that would be above the soybean canopy, they do provide a useful indicator of the field conditions at each farm. During the last week of June into early July, there were some days that were drier, especially around the 4th, but there was still approximately 8-10 hours of leaf wetness per day for many of the days during this period. Also note that the relative humidity during this same period has been high. Maybe more important, especially given the current growth stage of soybean is the increase in leaf wetness since the 4th, including 18-20 hours of leaf wetness at Lancaster on the 5th (increase in rainfall).

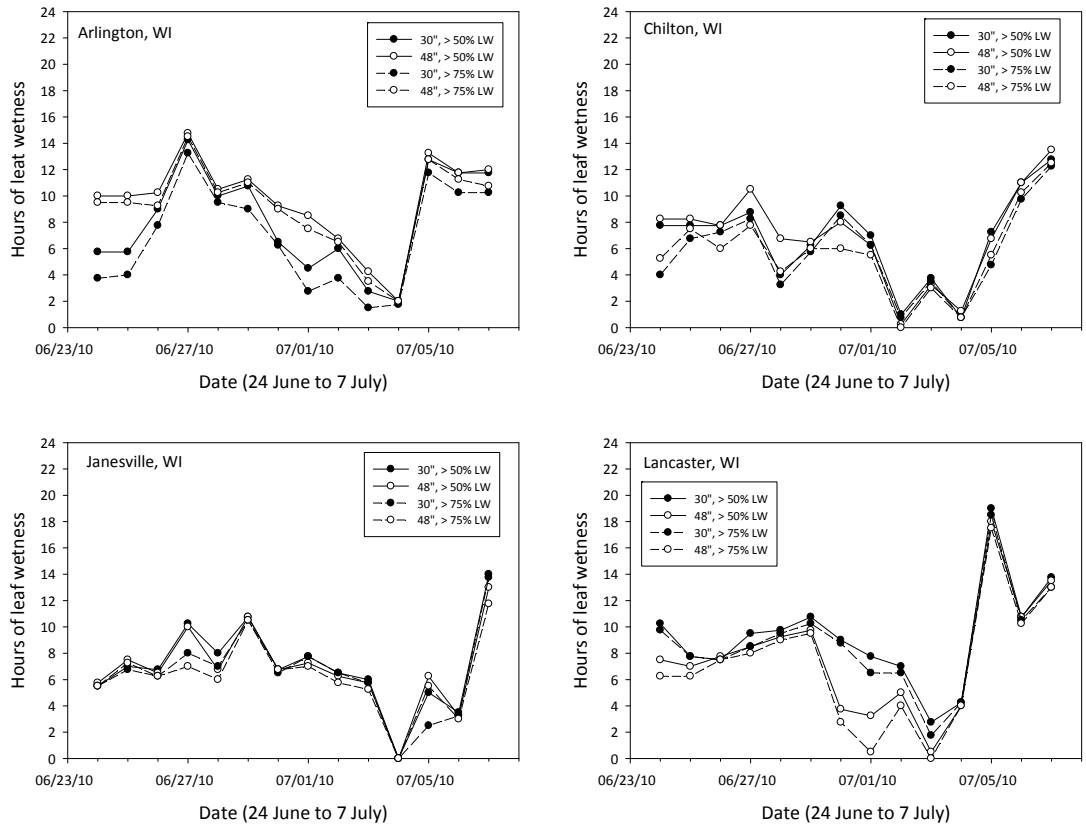


Fig. 3. Hours of leaf wetness on a daily basis (midnight to 11:45 PM each day) for Arlington, Chilton, Janesville, and Lancaster, WI.

What does this all mean? Predicting field by field risk is difficult but we can use several factors, including host plant development and growth stage to indicate that the risk of white mold is probably higher in the southern portions of the state. While conditions in 2010 are different from 2009 when we remained cool and damp throughout the entire growing season, there are several environmental conditions that are in the favorable range for white mold occurrence.