

Spring Freeze Damage to Wheat and Barley

Dr. Bob Kratochvil—Extension Agronomist, University of Maryland



Early April has arrived and with it many signs of spring. Typical of this time of year, temperatures can rise into the 70's and 80's which makes small grains grow rapidly. Also typical are nights when temperatures will drop below freezing. As I write this article, the forecast is calling for freezing temperatures to occur during the next few days.

As I peruse weather.com, I see predicted low temperatures on April 5 and April 9 of 25°F (Northeast and Central Maryland) to 29°F (Eastern Shore and Southern Maryland). These temperatures would be fine if it wasn't for the fact that this year barley and wheat are progressing about 10 days to two weeks ahead of normal. I received a report on April 4 that some barley fields on the Mid and Lower Eastern Shore had started heading April 1. Much of the wheat across the state already has entered Feekes Growth Stages 6 and 7 (jointing) and some is nearing Feekes Growth Stage 10 (boot stage). As you learn about these forecasted low temperatures, I am sure you are asking: 1) at what temperature is barley and wheat susceptible to frost damage; and 2) if that temperature occurs, how long does it need to be that cold to cause damage? By the time you read this article, you will know how cold it got and for how long.

The ability of cold temperatures to damage small grains is influenced by the growth stage of the two crops. At jointing, temperatures $\leq 24^{\circ}\text{F}$ for as little as two hours can be injurious to wheat and barley. For wheat or barley in the boot stage, temperatures of $\leq 28^{\circ}\text{F}$ for two hours or more can cause damage. And, if either crop is heading, the low temperature only needs to be $\leq 30^{\circ}\text{F}$ for about two hours to cause damage.

For wheat and barley still in Growth Stage 6 (early jointing), I doubt that you need to worry unless temperatures got colder than predicted. For more advanced wheat and barley (i.e. late jointing to early boot stage), there may be some damage. If it did occur, it probably affected barley more than wheat across the state with the exception of the Mid and Lower Eastern Shore where some wheat may have already advanced to the early boot stage. Barley that was heading will be the most likely to show signs of freeze damage particularly if temperatures dipped below 30°F for two hours or more.

It likely will take a few days or more to see symptoms. In fact, you may not see them until the barley or wheat is heading. A frequent symptom of minor frost damage is twisted spikes or spikes that appear to be caught on the flag leaf as they emerge from the boot. In more severe cases of freeze damage, you will see whole or partial white or discolored heads appear. And the worst scenario is when the cold temperatures freeze the anthers causing head sterility.

Many of the fields of wheat and barley that I have seen this year have potential for excellent yield. But, as usual, before that yield potential becomes a reality, Mother Nature will present some challenges.