

# WHEAT DAMAGE FROM COLD TEMPERATURES APRIL 6-9, 2007

Jim Herbek, Extension Grain Crops Specialist  
Lloyd Murdock, Extension Soils Specialist

## TEMPERATURE MEASUREMENTS

Minimum temperatures were taken inside of wheat canopies for the morning hours of April 6, 7, 8 and 9. The temperatures were taken at 1 inch above the ground and at 8 inches above the ground (head height). The official minimum reported air temperature taken 5 feet above the ground is also shown in the following table. The temperatures were taken in tilled and no-tilled wheat plantings and there was no difference in the measurements.

The temperatures were coldest at 8 inches above the ground. These temperatures are well below the 24 degrees and 28 degrees that would be expected to cause moderate to severe damage at the jointing (Feekes 6) and boot (Feekes 10) stages of growth, respectively. It is felt that these temperatures will result in severe damage to the lower stems and the developing heads to wheat at the Feekes 6 stage of development or later.

Temperatures varied across the state and will also vary even within short distances. It would probably be a safe bet to expect the temperatures in your wheat field close to the ground to be at least 3 degrees and probably 5 degrees colder than the temperature reported at the weather station in your area.

<b>Temperatures in Wheat Fields at Different Heights and Locations at Princeton, Ky on April 6-9, 2007</b>				
	<b>Temperature (F°)</b>			
<b>Measurement Location</b>	<b>April 6</b>	<b>April 7</b>	<b>April 8</b>	<b>April 9</b>
1 inch above ground	30	24	18	22
8 inches above ground	24	20	16	18
Official air temp	31	25	19	26

## **OBSERVATIONS MADE ON APRIL 9**

The recent freezing temperatures that occurred from April 6-9, 2007 have caused much concern regarding the extent of the damage to the wheat crop. Three basic conditions must be present for freeze damage to occur to the wheat crop. These are: 1) The wheat plant must be at a sensitive stage of growth (i.e. at least jointed); 2) Temperatures must drop to a certain critical level; and 3) The temperature must remain at the critical level for at least 2-3 hours. All of the above three criteria needed for freeze damage occurred during the period of April 6-9<sup>th</sup>. If wheat has jointed (Feekes stages 6-7), temperatures of 24°F or below for a period of 2 or more hours can injure wheat by killing the growing point and also causing stem damage.

We inspected wheat on the morning of April 9<sup>th</sup>, to determine what damage could be observed. There was obvious stem damage to wheat at Feekes stage 7 or later. The stems were very flacid, soft, and water soaked (indicating that the cells in the stem had ruptured). The growing point (developing wheat head) also seemed damaged. The developing wheat head also looked flacid and water soaked.

It was more difficult to assess if and to what extent damage had occurred on plants/tillers that were at Feekes stage 6. The stems seemed soft and flacid, but did not have the extensive water soaked appearance as plants/tillers that were at Feekes stage 7 or later. It was also more difficult to determine if and the extent of damage to the growing point (developing wheat head) at Feekes stage 6.

It is usually difficult to get a definitive assessment of plant damage immediately after a freeze has occurred. By waiting 5-7 days after warmer temperatures have occurred for wheat growth to resume, a more definitive, visible damage assessment can be made between damaged and undamaged plant tissue.

Damaged stems will become progressively discolored, collapsed/flattened, rotting, splitting, and bent or lodged. A damaged wheat head will progressively lose its green color and become a pale white, cream or tan color, limp, dehydrated, and not developing in size. If severe damage has occurred, the above symptoms should become readily apparent in 5-10 days after the freeze.

From initial observations made on April 9<sup>th</sup> to wheat plants/tillers at Feekes stage 7 or later, there appears to be very extensive stem damage which would result in large yield losses. It was more difficult to assess the extent of damage to plants/tillers at Feekes stage 6. A more definitive damage assessment could probably be made by waiting a few more days.

## **SUBSEQUENT PLANT DEVELOPMENT**

If the plant heads or stems are severely damaged, then grain development for harvest will have to come mainly from small or newly formed tillers. This will reduce the yield and delay harvest, if the crop is kept. The yield reduction would be substantial. The amount of yield loss depends on many things and is only a guess but it could be as much as 50% and possibly even more below the potential the crop had before the freeze. The development of the new tillers will also delay harvest compared to that of the undamaged crop. Again, the added delay will vary and depends on several factors, but it could be as much as 7 to 14 days.