

## **Important factors determining freeze damage**

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Temperatures may have gotten low enough in parts of the county last week to cause damage to the wheat crop. If there was damage to fields, it should be showing up this week. There are a number of key factors in determining freeze damage: the stage of development of the wheat, the density of the stand and condition of the plants, the amount of residue on the soil surface, the extent and duration of low temperatures, temperature gradients within the field, soil moisture, and the wind speed. At the time of the freeze, I would estimate that a good percentage of the wheat was jointed.

-- Jointing wheat can usually tolerate temperatures in the mid to upper 20's with no significant injury. But, if temperatures fall into the low 20's or even lower for several hours, the lower stems, leaves, or developing head can sustain injury. If the leaves of tillers are yellowish when they emerge from the whorl, this indicates those tillers have been damaged. Existing leaves may also be damaged so severely that they turn bluish-black and have a water-soaked appearance, then bleach out. This usually results in the field's having a "silage smell."

### **Injury symptoms**

The best thing producers can do for the first few days is simply walk the fields to observe lodging, crimped stems, and damaged leaves. It will take several days of warm weather to accurately evaluate the extent of damage. After several days, producers should split open some stems and check the developing head. If the head is green or light greenish in color and seems firm, it is probably fine. If the head is yellowish and mushy, it may have freeze injury.

There are also a couple of early signs producers might have noticed right away.

\* Silage smell. If a field of wheat is giving off the aroma of silage, that indicates that leaves have been damaged. Damaged leaves will likely turn black within a few days, then become bleached.

\* Ice in the stems. If there was ice in the stems below the first node the morning of the freeze, those tillers will probably be damaged (although not always) and may not produce grain. Freeze injury to the lower stem at this stage of growth can be a significant problem. This kind of damage may take a little longer to detect, but producers will eventually be able to find soft "lesions" on the lower stems. The damaged tillers may lodge.

\* Lodging. If the wheat lodged immediately after the freeze, that indicates stem damage. Later tillers may eventually cover the damaged tillers. If the main tillers are injured, secondary tillers may begin growing normally and fill out the stand. The wheat may look ragged because the main tillers are absent, but enough tillers may survive to produce good yields (if spring growing conditions are good). If both the main and secondary tillers are injured, the field may eventually have large areas that have a yellowish cast and reduced yield potential.

Tillers damaged during early jointing may stop growing, so the head will never emerge. In the boot stage, the heads will go ahead and emerge even if they are severely freeze damaged. However, that head may be partially damaged or completely dead. If the freeze damage is light to severe, heads may "back out of the boot." If the lower stems are damaged by freeze injury, the wheat plants will likely lodge at some point. Lodging could also be caused by other factors, however, so it will be important for producers to examine the lower stems on lodged plants to determine the cause. Plants may have simply leaned over due to environmental factors, such as a hard rain or high winds, after a freeze and will eventually come back up if the lower stem isn't damaged.