

# AGRONOMIC ALERT



## GREENSNAP INJURY IN CORN

Greensnap mainly occurs in the Western to Central Corn-Growing Area where high winds are more prevalent. Rapidly growing corn in the late vegetative stages to tasseling is most vulnerable to greensnap. Rainstorms, with high winds, impact the likelihood of greensnap.

### Greensnap Injury

Greensnap is the breakage of corn stalks at a node caused by high winds. It is also referred to as brittle stalk or brittle snap injury. This weather related agronomic phenomenon is observed when violent thunderstorms with strong winds occur during the corn growth stage when internodes are rapidly elongating and are susceptible to breakage.

There are two windows of potential greensnap injury, V5 to V8 and V10 to R2. Roundup Ready® technology and corn hybrids with the Roundup Ready® Corn 2 gene can reduce the incidence of greensnap in the early window at V5 to V8 because of a reduced reliance on post-emergence applications of growth regulator herbicides. Growth regulator herbicides can significantly increase the potential risk of greensnap during the V5 to V8 window when the growing point is just emerging from the soil line.

The corn plant is going through its most rapid rate of growth from V10 to R2. In a period of 17 to 21 days corn grows from around 4 feet to its mature height of 7 to 10 feet. During this rapid stage of growth leaf surface area increases logarithmically. This rapid growth and increase in surface area coincides with the period of greatest potential risk of severe thunderstorms in July and early August.



Greensnap Injury in Corn



### Factors that influence the incidence and severity of greensnap in a specific field:

1. Time of day of thunderstorm and velocity of wind speed.
2. Timing and severity of wind event relative to growth stage of the corn.
3. Growth conditions prior to the storm, such as soil moisture availability and temperature.
4. Planting date impact on stage of development on date of storm relative to neighboring fields.
5. Crop management practices that influence growth and development relative to other fields including, tillage, fertility, weed and pest management.
6. Field characteristics including topography, soil type, row spacing and row direction relative to the direction of the wind.

Typically greensnap injury is observed at the primary ear node or the node above or below the primary ear node. However, wind speeds above 80 mph can result in breakage at nodes above or below these typical sites.

Once a node has stopped expanding, cell walls are strengthened by the deposition of lignin that prevents breakage at that node. Straight line wind events after R1 or R2 may result in stalks kinking over or even breaking between nodes, but not actual greensnap stalk breakage which is at a node.

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Plants with greensnap injury often have visible ear shoots immediately following the storm event. However, the limited leaf surface area remaining to nourish the developing ear usually results in little or no grain production on injured plants.

### Assessing Storm Damage

The factor with the largest impact on the severity of greensnap damage in a particular field is the timing and severity of the wind relative to its stage of growth. Damaging thunderstorms that occur in early morning hours cause the most damage because temperatures are cooler and the cells of the corn stalk are filled with water, making the stalk less able to flex. Greensnap occurs from the violent repeated oscillation of the stalk from wind gusts, causing a fracturing of cells at a node. Damaging winds often occur in the first minutes of a severe thunderstorm before soils are softened by rain. Fields with hybrids firmly rooted in dry, firm soil may have more greensnap injury than fields with a shallow root system which tend to root lodge under similar wind conditions.

Understanding why early morning storms often result in greater greensnap storm damage requires an explanation of the physiology of corn growth during the V10 to R2 stage. At the base of every node is a region called a meristem, which is an area of rapidly dividing cells. Stalk growth occurs as a result of turgor pressure from water in the stalk expanding the size of these newly divided cells. Corn plants are most brittle when turgor pressure is the greatest in early morning hours when plants have taken up water overnight and are not under the heat stress of higher daytime temperatures.

Greensnap injury typically occurs at the node which is still undergoing rapid expansion but has yet to be strengthened by lignin and other structural materials in the cell walls after having reached its full size. The reason that you will observe neighboring fields break at different levels or different nodes is because hybrid maturity, planting date or other management factors may result in different nodes being vulnerable for a specific field at the timing of the wind event.

### Why are some fields impacted more than others?

Straight line winds during a severe thunderstorm are highly variable and unpredictable. This variability is easier to see when assessing damage to trees, grain bins, buildings or telephone poles. Variability will also occur in corn fields where straight line winds can result in narrow zones of destruction with highly variable patterns in fields.

A frustrating aspect of assessing wind damage is that it is often the highest yield potential fields that have the highest level of crop injury. A University of Nebraska study<sup>1</sup> found that there was a direct correlation to higher rates of nitrogen and increased severity of greensnap damage. Crop management necessary for high yield potential contributes to rapid growth, which in turn can influence the level of wind injury.

### Managing the risk of greensnap injury:

- **Evaluate crop insurance options and protect your financial risk from weather related crop injury by purchasing crop insurance.**
- **Plant a package of hybrids and maturities every year to help spread the window of growth and development for a specific storm event.**
- **Always follow the herbicide label for timing, tank mix partners and additives for all post-emergence herbicide applications.**

Source: <sup>1</sup>Elmore, R.W., G. Hoffmeister, Jr., R.G. Klein, and D.B. Marx. 2003. Online. *Crop Management* doi:10.1094/CM-2003-1212-01-RS. <http://www.plantmanagementnetwork.org> (viewed 7/13/11)

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