

Green Stem Syndrome in Soybeans

Adapted from ISU Integrated Crop Management News; ISU ICM Conference-Darren Mueller, ISU Extension; and Monsanto's Agronomic Spotlight

Last fall there were reports of some growers experiencing green stem syndrome (GSS) in their soybeans. We know how frustrating it can be to harvest those affected soybean plants. What can be done to correct or prevent this problem, you may ask? The answer isn't easy.

Green Stem Syndrome (GSS), is a soybean disorder in which the stems remain green while the pods and seeds are ready to harvest. An exact cause of GSS is not known but there are a number of factors associated with GSS. These include viral infections, insect feeding and certain environmental factors and stresses.

Viral Infections. Stress caused by bean pod mottle virus and soybean mosaic virus are possible causes. However, research has shown when tested some symptomatic plants are free of any known viruses, while some soybean plants found to contain these viruses do not always show GSS symptoms.

Insect Feeding. Plant stress during pod and seed development as the result of severe infestation and insect feeding can increase the occurrence of GSS. Beyond physiological damage to the plants, insects may also be viral vectors.

Environmental Factors. As a soybean plant grows normally, it serves as a "source" by producing high levels of carbohydrates to feed itself. When drought or other stress hits, the plant may abort or drop pods and/or seeds that act as the "sink" for the nutrients. Therefore the plant is forced to redistribute the sugars causing increased carbohydrate and nitrogen supply to the stem and roots. This redistribution (imbalance of source and sink) may cause the stem to live longer and retain its green color delaying or preventing natural senescence. Another environmental factor can be low fall humidity along with higher fall temperatures that may cause faster drydown of the grain but not enough time for the stems to dry.

Management Options. Until the specific cause or causes of GSS is known, no specific control recommendations can be suggested. Here are a few options to consider when dealing with GSS:

- No strong correlation has been found to variety specific resistance to GSS, making variety selection a minor factor. However, planting date and product maturity may help reduce the risk of drought and heat stress relative to the stage of soybean plant development.
- ISU Extension research found that in 2014 and 2015, fungicides increased the occurrence of GSS; more so when plants were stressed (less pods).
- Allow soybean plants to drydown in the field or wait until a hard frost, but understand the increased risk of pod shatter or damage from bad weather may be more detrimental or yield robbing.
- Monitor fields and harvest according to moisture content. Green stems are difficult to cut, so the combine should be in good operating condition, properly adjusted with sharpened cutting knife sections and operated at a slower speed.



Figure 1. Plants with mature pods & dry stems (right) & plants with green stems (left) in the same field. Photo courtesy of Darren Mueller, ISU Extension.



Figure 2. Soybean plant with mature soybean pods and green stems common with GSS. Photo courtesy of Agronomic Spotlight, by Monsanto.