


# MESSENGER-INQUIRER

 Cooperative  
Extension Service



## Farm Update

[daviess.ca.uky.edu](http://daviess.ca.uky.edu)

AGRICULTURE & NATURAL RESOURCES  
EDUCATION

Clint Hardy

Daviess County Extension Office

September 21, 2024

### Green Stem Soybeans

Dr. Dennis Egli, Professor Emeritus of the UK Department of Plant and Soil Science wrote the following article about the causes of green stem.

No producer wants to see soybean plants with green stems in a field ready to harvest. What's to be done? More importantly, can they be prevented? Understanding the green-stem syndrome will help answer these questions.

Green stems have been attributed to virus diseases, insect feeding, and environmental stress. To learn more about the causes of green stem, Bill Bruening, the UK soybean variety test coordinator, and I investigated the effect of pod removal on the appearance of green stems. We had two treatments, removing 25% and 50% of pods at the beginning of seed filling, R6, for two years to soybean varieties from Maturity Groups III, IV and V, three varieties within each maturity group. We monitored the appearance of brown stems and pods as the plants matured and we measured seed moisture and carbohydrate and N levels in the stems at maturity. Our depodding treatments produced the green-stem syndrome – fully mature brown pods on plants with green stems – 50% removal produced more green stems than 25% pod removal.

# MESSENGER-INQUIRER

Stems on the depodded plants eventually turned brown with the delay, compared to the control, varying from as little as 4 days to more than a month. One variety still had green stems when a killing freeze occurred 46 days after the control reached 65% brown stems. We couldn't reach any conclusions about variety or maturity group effects because of extreme variability between years and the fact that depodded plants were often killed by frost before the green stems turned brown.

Pods on depodded plants turned brown only a few days after the control plants with no apparent differences among varieties or maturity groups. Seed moisture levels when pods on green-stem plants turned brown were the same as the seeds on control plants.

The green stems contained much higher levels of soluble sugars, starch, and N than the control plants when 95% of the pods were brown. The 50% depodding treatment always had higher levels than the 25% treatment.

Reducing the pod load produced classic green-stem symptoms – the remaining pods matured at roughly the same time as the control, but the stems stayed green. Let's consider what happens in a normal plant during seed filling. Soybean plants start to senesce early in seed-filling. The enzymes in the leaves responsible for plant growth are destroyed and the amino acids are shipped out to the growing seeds. Sugars and nitrogen stored in the stems are also translocated to the developing seeds. The plant basically destroys itself to support seed growth, leaving very little sugar and N in the abscised leaves and stems.

The lack of pods reduced redistribution of sugars and N to the seeds, so the stems stayed green.

This same process can cause the leaves to stay green instead of turning yellow and falling off the

# MESSENGER-INQUIRER

plant. The cause of green stem seems to be an abnormal reduction in the pod load that prevents the normal senescence processes from occurring.

So, the question – what causes green stem - is replaced with the question - what reduces the pod load? Plants that are infected with certain viruses such as bean pod mottle virus often exhibit reduced pod loads. Stink bugs feeding on pods obviously reduce the pod load. A variety of environmental stresses will increase flower, pod abortion, and reduce the pod load potentially causing green stem. Any stress that reduces the pod load can cause green stem. The variety of causal agents makes managing green stem a real challenge, especially when the plants are set up for green stem well before green stems are visible.

What should a producer do when facing a field full of green stems? Since the seed moisture in the pods on the green stem plants is similar to those on non-green stem plants, one option is grinding those green stems through the combine. Another option is to wait for the green stems to turn brown before harvesting. Unfortunately, the delay may increase pod shattering, or disease may infect seeds before harvest, causing reductions in yield and/or quality. Obviously, neither option is very attractive.

There is no neat simple solution to the problem of green stems. Keeping your fields as disease and insect-free as possible will help, but it won't protect you from the environmental aspects of this problem.

# MESSENGER-INQUIRER

The Martin-Gatton College of Agriculture, Food and Environment is an Equal Opportunity Organization with respect to education and employment and authorization to provide research, education information and other services only to individuals and institutions that function without regard to economic or social status and will not discriminate on the basis of race, color, ethnic origin, national origin, creed, religion, political belief, sex, sexual orientation, gender identity, gender expression, pregnancy, marital status, genetic information, age, veteran status, physical or mental disability or reprisal or retaliation for prior civil rights activity.