

Green Soybean Plants



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While many soybean fields are drying normally and harvest is getting underway, there are reports and observations of soybean plants that have dry pods and seeds but green leaves and green stems. Many of these fields have too much

green tissue to combine but are in danger of shattering as pods and seeds continue to dry.

In some ways this appears to be the “green stem syndrome” that has cropped up in some fields in some years. We think that this occurs when seeds stop taking up sugars and nitrogen before senescence is complete. Stems and petioles continue to photosynthesize but sugars have no place to go, so they accumulate and keep leaf and stem tissues healthy and green. Lower temperatures and more soil moisture recently have likely contributed some to this problem by keeping leaves well supplied with water and slowing sugar movement and leaf drying.

While we think this explains what happens, it's much less certain in many cases why it happens. One near-certain cause is lack of pods – when disease or drought or insect damage (rare in North America) result in low pod numbers, the senescence signal normally sent by seeds and pods isn't sent or isn't received normally, and leaves don't lose their protein. This means that they stay green and stay attached, while continuing to produce more sugars.

We think that lack of pods in drought-stressed fields is one of the factors leading to this problem in 2012. But there are two unusual features this year. One is that pods seem to be maturing and drying normally; in many cases we have seen before, pods tend to stay green or to dry slowly when pod numbers are low.

We are also seeing this year that some fields have only the lower leaves staying green and attached to the stem, while upper leaves senesce normally. We think that the soybean senescence signal is usually all-or-none; that is, when enough seeds are reaching maturity, all leaves on the plant senesce and fall. It's possible that so many lower pods failed to develop that sug-

ars from the lower leaves had no place to go, and that without a “sink” for sugar and nitrogen, these leaves could not senesce normally, while the upper leaves could and did senesce.

Regardless of the cause, green leaves on plants with dry pods will probably stay green, quite possibly until frost. Even frost may not damage leaves effectively when they have a lot of sugar, since sugar acts as an antifreeze. Gramoxone is labeled for use as a soybean defoliant, but there is a 15-day wait until harvest, and it's not clear how cost-effective it would be, especially if it has to be applied by air.

Some fields have a “mottled” appearance, with green and yellow and leafless plants all present. It may be possible as more green plants start to lose color to combine these, taking care not to have green tissue interfere with threshing or cleaning. But in many cases we'll simply have to wait until plants dry and hope that seeds don't shatter before they can be combined.

Green leaves trap some moisture from dew, and pods on plants with green leaves aren't as exposed to drying conditions as are those on plants without leaves, so pods may stay intact better than they otherwise would. On the other hand, reports of shattering this year suggest that pods may have been weakened due to drought conditions. So our hope may not be realized.

There are some indications that the problem of dry pods on green plants may be related to variety, but this is not very clear. Later-maturing varieties are more likely to experience this problem, in part because severe stress can (and in some cases did) desiccate early-maturing varieties before the normal senescence sequence kicked in. Varieties with little foliar disease, either because of genetic resistance or as a result of fungicide application, may be more prone to stay green.

Though the green-stem issue has been studied to some extent, there has been little progress in finding preventive measures or a cure. Unfortunately, conditions like we have had in 2012 will usually result in more of this, adding one more problem to what will be low yields in some of the affected fields. Δ

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