As soybean plants mature, leaves, stems, pod walls, and seeds proceed through an orderly progression of events that appear well synchronized among the plant parts. Leaves, including their petioles, lose their green color, turn yellow, and drop from the plant. Stems also lose their green color, lose moisture, and become dry and brittle. Pod walls change color, lose moisture and, although they remain intact, become easy to break open. Finally, seeds change from green to a light yellow color and from oval to spherical in shape as they lose moisture.

At least that is what is supposed to happen. But, nearly every Missouri farmer knows that soybean plants do not always behave and sometimes fail to mature normally. Misbehaving plants are said to exhibit “green stem” or “green plant” disorder (or syndrome). Plants that fail to mature are a pain to farmers. Sometimes yield is reduced, but much more commonly, harvest is either delayed or slowed greatly because green pods are difficult to thresh and green plant parts do not pass through the combine quickly.

If we understood soybean senescence (maturing and death) more, we might have a better explanation of the causes of these disorders. We’ve been studying soybean plant physiology for more than 60 years and the plant has yet to reveal all of its mysteries. But, I’m sure that it is far more complicated than simply a “self destruct” mechanism. This theory describes a process in which proteins are broken apart and sent to rapidly growing seeds. More than 60 percent of the protein in leaves exists in the main enzyme involved in photosynthesis. As the plant destroys this enzyme, leaves lose color, senesce and die. As leaves die, the plant matures.

Soybean senescence is a complicated interaction between the genetics of the plant and environmental signals such as photoperiod length (shorter days) and temperature. This interaction causes significant and often irreversible changes in the plant. Several plant hormones increase and then decrease in a specific sequence. Genes are switched on and off. The end point of these changes is a slowing of critical life processes followed by cell death. Sometime drought or temperature stresses cause plants to misread the environmental signals – or perhaps the signals are abnormal. An excellent example is green soybean plants near a security light that is lit through out nights. Plants away from the light mature, but plants close to the light sense a different photoperiod and fail to mature. Insects and diseases can also affect plant structure and function, which can interfere with senescence.

Carefully recording field notes may help management of green plant or stem disorders. Observation as to which plant parts remain green is the first step in attempting to diagnose cause. In some situations, the entire plant remains green. Close examination of the plant reveals that few pods are present which contain few seeds. Often, but not always, affected plants are few and widely scattered. Bean pod mottle virus or tobacco ringspot virus (causes soybean budlight) is the likely cause. Bean leaf beetles carry bean pod mottle so careful scouting for and control of this insect may help manage this disease.

If green plants occur in one or more patches within the field a likely cause is green stink bug. This insect does not fly well and often lands on plants near the field edge. Adults and their young slowly enlarge their area of infestation. Stink bugs pierce soybean pods and inject digestive enzymes. Pod and seed growth is often dramatically reduced, and because of the reduced pod load soybeans fail to mature. Again, careful scouting for and control of stink bugs will help manage this cause of green plant disorder.

Sometimes only the stems remain green. The unusual characteristic of this disorder is that pods and seeds do not always behave and sometimes fail to mature normally. This disorder often delays harvest because without careful inspection it is difficult to detect maturing seeds. Often, harvest is delayed long enough that pods shatter and yield loss occurs. The cause of this syndrome is a mystery, but is probably related to weather and not insects or diseases. I’ve seen it in my plots when a short drought stress was followed by excellent growing conditions. Varieties differ for susceptibility, but finding information about specific varieties is difficult. And, susceptible varieties often fail to exhibit the disorder. Noting the variety and changing to an alternative is about all that farmers can do to manage this disorder.