

## Late Season Soybean Management

- The soybean reproductive stage R4 or full pod is the most crucial period for determining yield potential.
- Plant stress caused by insects, diseases, weeds, moisture, and fertilization at full pod results in more yield losses by limiting seed number and/or seed size than any other time.
- It is very important to understand the impact of plant stress in order to make timely decisions that may help protect soybean yield potential.

### Insects

**Stink bugs.** Several species of stink bugs can infest soybean fields including green stink bugs (*Acrosternum hilare*), southern green stink bugs (*Nezara viridula*), and brown stink bugs (*Euschistus servus*).<sup>1</sup> Stink bugs are shield shaped ; juveniles or nymphs do not have wings, but are similar in appearance to adults. Stink bugs damage soybean plants by sucking juices from pods and causing pods to drop. Both adults and nymphs can injure soybean plants.



Figure 1. Adult green stink bug.  
Photo source: Susan Ellis,  
Bugwood.org.



Figure 2. Adult brown stink bug.  
Photo source: Russ Ottens,  
University of Georgia, Bugwood.org.

**Soybean podworm, *Helicoverpa zea*** (also known as corn earworm). Soybean podworm can be the worst insect pest of soybean, especially in the southern growing regions of the United States. Infestations normally occur from late July through August. Small larvae are usually brown with a dark head and as the larvae grow, the color changes



Figure 3. Soybean Podworm.

from yellowish green to black; the head color on large larvae is usually orange. Larvae first feed on foliage. When there are large populations, severe defoliation will occur. Once soybean pods begin forming, larvae start feeding on pods and can cause severe damage.

**Soybean aphids (*Aphis glycines*).** Soybean aphids are minute

yellow-colored insects with distinct black cornicles. They are usually found in soybean fields from late May through August. Aphids can cause injury to soybean plants by sucking plant juices. If populations

are high, feeding may cause reduced plant vigor and leaf puckering. If feeding continues through the pod filling stage, pod set may be affected resulting in fewer seed per pod.<sup>2</sup> As much as 50% yield reductions may occur in severely infested fields. Aphids over threshold during the pod filling stage can have a greater reduction in yield potential than outbreaks at R5 or R6 growth stages.



Figure 4. Soybean aphids.

Occurrence of the insect pests is highly variable each season. Treatment thresholds and recommendations vary by state. Please contact your local agronomist for thresholds and apply insecticides as needed.

### Diseases

**Frogeye Leaf Spot (*Cercospora sojina*), Sudden Death Syndrome (*Fusarium virguliforme*), Stem Canker** (Northern states—*Diaporthe phaseolorum* var. *caulivora*, Southern states—*D. phaseolorum* var. *meridionalis*), **Phytophthora Root Rot (*Phytophthora sojae*), Charcoal Rot (*Macrophomina phaseolina*), and Pod and Stem Blight (*Diaporthe phaseolorum*)** are fungal diseases that may affect soybeans late in the season.<sup>4</sup>

Frogeye leaf spot produce spots on the leaves (Figure 5), while interveinal yellowing may form with sudden death syndrome (SDS) and stem canker. Premature defoliation is also a concern frogeye leaf spot, phytophthora root rot and stem canker. Since pod set through seed fill stages (R3 through R6) are the most critical period for yield potential, leaf loss can significantly reduce yield potential. Healthy, green plant material is necessary for



Figure 5. Frogeye leaf spot.

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photosynthesis and converting sugars for pod fill; therefore, it is important to protect the leaf tissue.

Pod and stem blight can be found on stems, petioles, and pods in the early reproductive stages as irregularly-shaped brown blotches. Infection on pods may result in fewer or smaller seeds per pod. Leaf defoliation is also an issue if infestation is severe.

Symptoms of stem canker first appear during the early reproductive stages as small, red-brown lesions (Figure 7). Initial lesions are usually found near a lower leaf node and expand lengthwise as the season progresses. Lesions eventually girdle the stem, causing wilting and plant death.

Fungicide applications should be considered if the infestation reached threshold levels during pod developmental stages (R3 to R5). Spraying fungicides after R6 is generally not recommended.



Figure 6. Pod and Stem Blight  
Photo source: Clemson University -  
USDA Cooperative Extension Slide  
Series, Bugwood.org.



Figure 7. Stem infected with stem  
canker: slight discoloration of the  
cortex is present and reddish brown  
cankers (at arrow) are evident.

## Tips for Proper Fungicide

**Application.** Soybean diseases usually start in the lower canopy and move into the middle, then upper canopy as the crop matures. Therefore, fungicide spray needs to be placed as deep into the canopy as possible. Sprayer reconfiguration is necessary to obtain good coverage and canopy penetration. Using a spray volume of no less than 15 gallons per acre is important to provide good coverage, especially later in the season when the canopy is deeper and denser. Nozzle, type, spray pressure, application volume, and speed determines the uniformity of spray deposition and penetration into the canopy.<sup>4</sup> Flat-fan pattern nozzles are generally the best choice, provided the spray from these nozzles is characterized as high-fine to mid-medium (200-300 micron droplets in diameter). Proper nozzle orientation and overlap is also critical to achieve good spray deposition.

## Weed management

Weeds compete with a crop for light, moisture, and nutrients and can become a yield limiting factor. To maximize yield potential, weeds must be controlled between V1 and V3 soybean stage. This is usually referred as the critical time for weed control.<sup>5</sup> Early season weed control is important for early canopy development and for maximizing

yield potential in soybean. Plants that develop canopies early may have increased flowering time and number of main-stem nodes. Weeds that emerge later in the season have little direct effect on yield potential, but may interfere with harvesting and add foreign matter to the harvested soybean grain. Although good early season weed control is critical for optimum yield, sometimes situations arise where in season weed management is warranted. Over-the-top applications can be used in controlling late germinating weeds and weeds not controlled by preplant or preemergence herbicides.<sup>6</sup> If herbicides are necessary, choose the chemistry depending upon the type of weed present in the field.

## Water Stress

Soybean plants require the most water during pod development (R3-R4) and seed fill (R5-R6). Moisture stress from flowering through pod fill stage can reduce yield potential severely by producing smaller or fewer seeds or both.<sup>7</sup>

## Nitrogen Application

Since soybean produces nutrient rich, high protein seed, nitrogen (N) requirements of this crop are rather high. Peak N demand in soybean production is during pod fill or growth stages, R4 to R6. The N demand at this time is more, and fixed N alone may not be enough to meet it. Both soil N and fixed N may be necessary for maximizing soybean yield potential, particularly under high-yield environments.<sup>8</sup> Research shows that supplemental N during these growth stages may help protect yield potential.

### Sources:

- <sup>1</sup> Soybean insect pests. North Carolina Cooperative Extension Service. <http://ipm.ncsu.edu> (verified 6/17/14).
- <sup>2</sup> Soybean aphid, speed scouting worksheet, Field Crops IPM, Purdue University. <http://extension.entm.purdue.edu> (verified 6/17/14).
- <sup>3</sup> Brown spot—Septoria leaf blight. Iowa State Univ Extension. January 2006. Online at <http://extension.agron.iastate.edu>. (verified 6/17/14).
- <sup>4</sup> Late season soybean diseases. 2013. University of Missouri Extension. [www.ipm.missouri.edu](http://www.ipm.missouri.edu). (verified 6/23/14)
- <sup>5</sup> Knezevic, S.Z. et al. 2003. Yield penalty due to delayed weed control in corn and soybean. Plant Management Network. <http://www.plantmanagementnetwork.org>, (verified 06/27/2013).
- <sup>6</sup> Ferrell et al. 2012. Weed management in soybean, Florida Cooperative Extension Service, University of Florida, Publication number SS-AGR-05. <http://edis.ifas.ufl.edu> (verified 6/17/14).
- <sup>7</sup> Thomas J, G. and Blaine, A. 2010. Soybean irrigation, Mississippi State University Extension Service, Publication number 2185. <http://msucares.com> (verified 6/17/14).
- <sup>8</sup> Wesley, et al. 1998. Effects of late-season nitrogen fertilizer on irrigated soybean yield and composition. Journal of Production Agriculture, Vol. 11, : 331-336. <http://www.agronomy.ksu.edu> (verified 6/17/14).

For additional agronomic information, please contact your local seed representative.

Individual results may vary, and performance may vary from location to location and from year to year. This result may not be an indicator of results you may obtain as local growing, soil and weather conditions may vary. Growers should evaluate data from multiple locations and years whenever possible. **ALWAYS READ AND FOLLOW PESTICIDE LABEL DIRECTIONS.** Asgrow and the A Design®, Asgrow®, DEKALB and Design® and DEKALB® are registered trademarks of Monsanto Technology LLC. Deltapine® and Leaf Design® are registered trademarks of Monsanto Company. All other trademarks are the property of their respective owners. ©2014 Monsanto Company. CRB06172014.