



Pod and Stem Blight and Phomopsis Seed Decay

Pod and stem blight and Phomopsis seed decay are caused by fungi in the genus *Diaporthe*. Pod and stem blight and Phomopsis seed decay are found in the United States and Canada and can cause disease on soybean when conditions are conducive.

Pod and stem blight often damages maturing plants and can result in premature death. Phomopsis seed decay can greatly affect seed quality. Both diseases can occur when susceptible varieties are planted and there is greater than normal rainfall during the pod-filling growth stages.

Symptoms and Signs

Pod and stem blight is characterized by black, raised specks that appear in linear rows on mature soybean stems (Figure 1). These specks are fungal reproductive



Figure 1. Linear black dots (pycnidia) along soybean stems are indicative of pod and stem blight.

structures known as pycnidia. These black structures may also cover pods, but they may not follow the linear pattern seen on stems (Figure 2). These signs are most prevalent when soybeans are nearing maturity, from R6 (full seed) through R8 (full maturity).

Phomopsis seed decay is characterized by cracked, shriveled seed with white chalk-colored mold on the seed surface. Seeds may also have pycnidia (Figure 3). Seedlings that develop from infected seed may have small reddish-brown lesions or streaks on the cotyledons or lower stems.

Disease Cycle

The fungi that cause pod and stem blight and Phomopsis seed decay overwinter on soybean residue. The fungus may also infect seeds and serve as another source of inoculum. Weeds such as velvetleaf and pigweed are also hosts of the fungi that cause the disease.

The fungus infects soybean plants early in the season when rain splashes spores from residue or from planting infected seeds. However, the fungus infects pods between R5 (beginning seed) and R6 (full seed) growth stages, which is important since only infections initiated in the pods can infect seeds and cause seed decay.

As soybean plants reach the R7 growth stage (beginning maturity), pod colonization declines drastically as seed



Figure 2. Pycnidia on soybean pods indicate infection by the pod and stem blight fungus.



Figure 3. Soybean seeds that have white chalky mold may have Phomopsis seed decay.



Figure 4. Stems affected by pod and stem blight may have visible black streaks or lines.

moisture drops. Seeds will not become infected once moisture is below 19 percent. However, during periods of wet and warm weather, seed infection and colonization can continue or resume if seed moisture increases to more than 19 percent. Therefore, delayed harvest can increase the risk of Phomopsis seed decay.

Disease Diagnosis

Look for the linear alignment (rows) of black pycnidia. These rows will distinguish pod and stem blight from anthracnose stem blight and charcoal rot, both of which have randomly scattered black fruiting bodies on soybean stems. The *Diaporthe* species of pod and stem blight

produce black zone lines that are visible when the stem is sectioned transversely or longitudinally (Figure 4).

Diseases With Similar Symptoms

The pod and stem blight fungus produces black pycnidia in linear rows on mature soybean stems; however, these can be confused with symptoms of other soybean diseases.

Yield Loss and Impact

Yield losses from pod and stem blight can be significant, but depend on the cultivar's susceptibility and the weather during maturity. In years where rainy, wet conditions persist from early to midseason, damage and yield loss will be higher.

Yield losses from pod and stem blight result from incomplete seed fill caused by early plant death. Diminished seed quality and reduced seed vigor, germination, and emergence are all consequences of Phomopsis seed decay. Phomopsis seed decay can also reduce seed test weight and oil content.

Management

This pathogen is very well managed through choosing varieties with the best resistance package. If pod and stem blight or Phomopsis seed decay do develop in a cultivar you planted, avoid that cultivar in the future and practice techniques to reduce the amount of inoculum in a field, including tillage and rotation to nonhost crops such as corn.

Delaying harvest increases the risk of pod and stem blight, because plants are likely to be exposed to cool and wet conditions that favor disease development. Thus, timely harvest will help reduce the risk of seed decay and preserve seed quality (Figure 8).

Do not plant seed with a high incidence of Phomopsis seed decay. Infected seed can be treated with fungicide

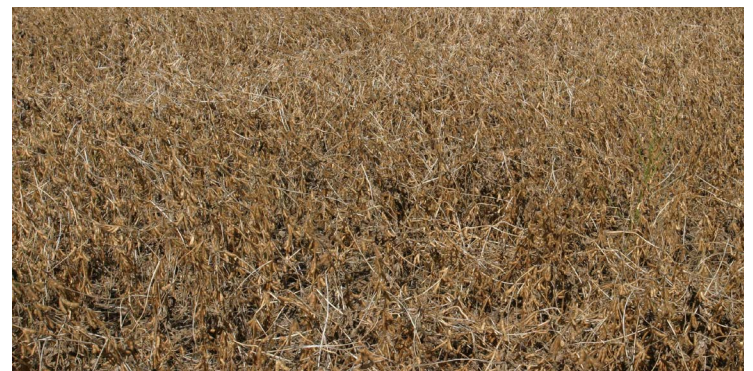


Figure 8. Soybean fields that are exposed to wet weather after maturity are at greater risk for pod and stem blight and Phomopsis seed decay.

Anthracnose Stem Blight (*Colletotrichum truncatum*)

Anthracnose stem blight produces irregularly shaped, red to dark brown blotches on the stems and petioles during the soybean plant's early reproductive stages (Figure 5). Anthracnose may result in the stem resembling a shepherd's crook. Near soybean plant maturity, black fungal bodies are evident on infected stems, petioles, and pods. Under magnification, the fungal bodies have black spines.

How to distinguish anthracnose stem blight from pod and stem blight:

With anthracnose-affected plants, the black specks and blotches on the stems do not occur in lines. The characteristic signs of the anthracnose fungus can be seen when viewed under magnification.

Figure 5. Large, irregular dark blotches on soybean stems are a common symptom of anthracnose.



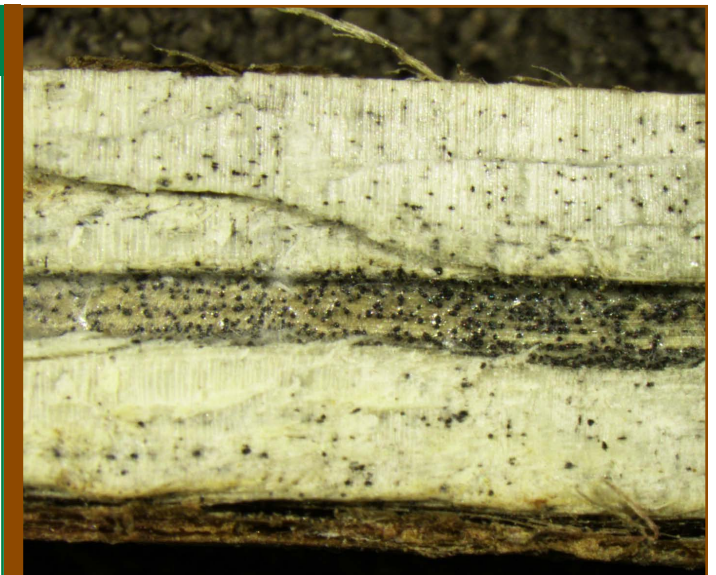
Charcoal Rot (*Macrophomina phaseolina*)

Charcoal rot's visible symptoms typically occur when the plant is near maturity. Plants may wilt and die, especially in the driest parts of fields. The characteristic signs of the charcoal rot fungus are the presence of very small, hard, and black fungal structures called microsclerotia, which are found in root and stem tissue (Figure 6). The lower woody portion of the stem of plants with charcoal rot may initially have a silver or gray discoloration.

How to distinguish charcoal rot from pod and stem blight:

Split the stem and view it under magnification. In plants affected by charcoal rot, you will see individual microsclerotia within plant tissue, which differentiates this disease from pod and stem blight.

Figure 6. Dark specks in the inner soybean stem tissue are common with charcoal rot.



Saprophytic Fungi

Once soybeans have senesced, many fungal organisms will colonize the dead plant tissue as a food source. These fungi, called saprophytes, do not infect the plant during the season, but survive by colonizing dead tissue. Saprophytic fungi will more heavily colonize soybeans that senesce early from disease or abiotic disorders. This can result in stems taking on a dark appearance that can be confused with the signs of pod and stem blight (Figure 7).

How to distinguish saprophytic fungi from pod and stem blight:

Laboratory diagnosis may be needed to distinguish saprophytic fungi from pod and stem blight.

Figure 7. Saprophytic fungi produce dark structures on soybean stems that resemble symptoms of pod and stem blight.



seed treatments, which usually increases germination and emergence. Do not use seed lots with more than 20 percent Phomopsis, because severely infected or moldy seed will fail to germinate even after being treated.

Currently available fungicide seed treatments generally appear to be effective against Phomopsis seed infection.

Foliar fungicide applications for pod and stem blight between R3 (beginning pod) and R5 (beginning seed) may reduce stem and seed infection especially in seed production fields. Although fungicide applications may reduce disease and improve seed quality, yield may not be affected.

Find Out More

To learn more about pod and stem blight and Phomopsis seed decay, visit the visit the NCSRP Soybean Research Information and Initiative (SRII) website (www.soybeanresearchinfo.com) or consult your land-grant institution. Other publications in the *Soybean Disease Management* series are available by visiting the SRII website or your land-grant institution's website.

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