

Cercospora Leaf Blight and Purple Seed Stain of Soybean

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Cercospora leaf blight is a foliar disease of soybeans caused by multiple species of *Cercospora*. This disease is becoming increasingly important in soybean production regions, including North Dakota, due to its potential to reduce yield and negatively impact seed quality. In addition to causing foliar damage, these *Cercospora* species are also responsible for purple seed stain, further reducing the marketability of harvested soybeans. Across the U.S., these two diseases can lead to yield losses of up to 18 million bushels, but the yield losses present in North Dakota are currently unknown.

Causal Agents

C. kikuchii has been considered the primary pathogen responsible for CLB. However, recent studies from the southern U.S. have identified that additional species are involved in the development of this disease including *C. cf. flagellaris*, *C. cf. sigesbeckia* and *C. nicotianae*. The populations of *Cercospora* species have not yet been explored in North Dakota, but it is estimated to be a complex of multiple players causing disease.

These pathogens survive in soybean residue where it can persist between growing seasons. The fungus produces spores that spread through the air and infect soybean plants, particularly under warm (75-80 degrees Fahrenheit) and humid conditions (greater than 75% relative humidity). CLB can affect soybeans at various stages of growth, although symptoms are most often observed during the middle to late reproductive stages.

Symptoms

The most distinctive symptom of CLB is the purplish or bronzed discoloration that appears on the uppermost leaves of infected plants, typically during the late reproductive stages (R5-R6). This discoloration gives the affected leaves a leathery, shiny appearance. As the disease progresses, the leaves may become dark purple or nearly black, especially under severe infection (Figure 1).

In addition to the foliar symptoms, *Cercospora* species can also cause purple seed stain. Infected seeds may show varying degrees of purple discoloration, ranging from small specks to complete coverage (Figure 2). This can reduce seed quality, leading to lower market value for the harvested crop. If infected seed is planted in the spring, reduced germination may occur, seedlings may be weaker and this may serve as a new source of inoculum for further infections.

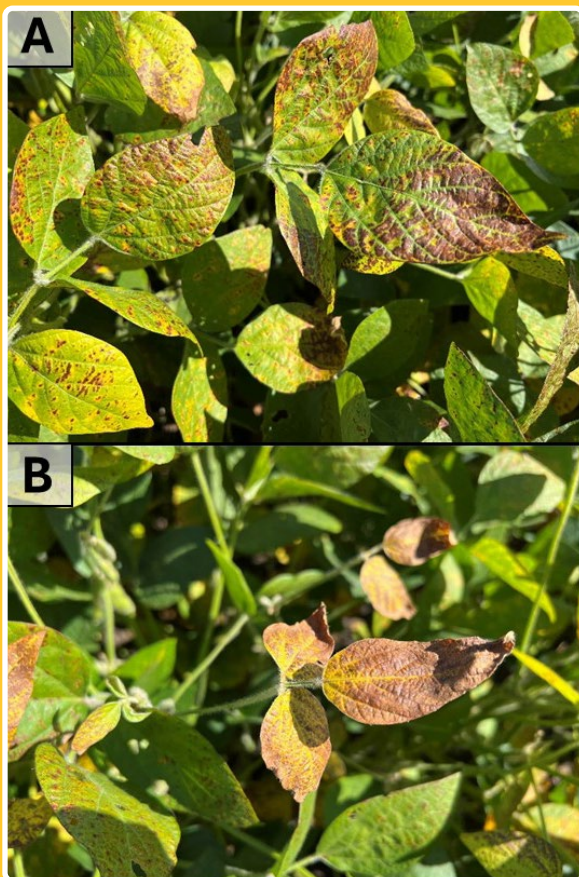


Figure 1. Cercospora leaf blight on soybean leaves. Severe infections can lead to burned appearance and dead leaf tissue. (NDSU photo)



Figure 2. Purple seed stain on soybean seeds. (NDSU photo)

■ Disease Cycle

Cercospora species survive in crop debris as fungal spores and mycelium. During the growing season, the fungus can produce conidia (asexual spores), which are dispersed by wind and rain splash. These spores infect soybean plants, particularly under conditions of high humidity and warm temperatures. Infections typically begin during the vegetative stages, but symptoms are not usually visible until later in the season. Warm, wet weather accelerates the disease cycle, leading to more significant foliar damage and higher levels of seed infection.

■ Management Strategies

Managing CLB requires an integrated approach, combining cultural practices, resistant varieties and fungicide applications. Farmers should focus on reducing the conditions that favor the disease and protecting their crop during critical periods of development.

- **Resistant Varieties:** While there are no soybean varieties fully resistant to *C. kikuchii*, some varieties show partial resistance to CLB and purple seed stain. Planting these varieties can help reduce the severity of the disease.
- **Crop Rotation and Residue Management:** Since *C. kikuchii* survives in soybean residue, crop rotation with nonhost crops (such as corn or small grains) can help reduce inoculum levels in the field. Additionally, practices like tillage can help break down soybean residue, thereby reducing the amount of inoculum available to infect the next soybean crop.
- **Fungicide Applications:** Fungicides can be an effective tool for managing CLB, particularly in fields with a history of the disease. However, in North Dakota CLB pressure has not historically ever been high enough to make these applications economically feasible. This may change in the future due to shifts in environmental and pathogen pressures.
- **Scouting and Field Monitoring:** Regular scouting is critical for early detection of CLB. Fields should be monitored during the reproductive stages for the characteristic purple or bronzed discoloration on the uppermost leaves. Early detection can inform management decisions, such as the timing of fungicide applications.
- **Seed Quality Management:** In addition to managing foliar symptoms, farmers should also be aware of purple seed stain. Infected seeds may have reduced germination and quality, so seed treatments may be necessary to protect seed lots intended for planting. Farmers who observe significant purple seed stain should work closely with their seed dealers to evaluate seed quality before planting.

For more information on managing CLB or purple seed stain in soybeans, visit the [Soybean Disease Diagnostic Series](#) on the North Dakota State University Extension website or contact your local Extension agent.

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