



Mid- to Late-Season Cotton Leaf Diseases

Mid- to late-season foliar cotton diseases occur when a crop is under stress. Stress can come from all directions: conditions can be too dry or too wet, insects or storms can damage plants, poor fertility can strain growth, and many other things can all negatively impact the health of a crop. Mitigating conditions conducive for disease development—and understanding if and when a fungicide application is necessary—is important to help maximize yield potential.

Target Spot

Symptoms

Target spot (*Corynespora cassiicola*) often occurs after extended periods of leaf wetness. Lesions are marble sized with concentric rings (Figure 1). Target spot infection typically begins on lower leaves as water splashes from infected debris on the soil to lower leaves on the plant. Infection can quickly move upward and result in premature defoliation. Lesions may also appear on bolls and boll bracts.¹

Diagnostic Notes

Target spot is commonly found in Georgia, Florida, and Alabama, and the infection can also be found in other parts of the Southeast and Midsouth. Target spot can be differentiated from *Alternaria* and *Stemphylium* because target spot lesions lack a dark margin, and premature defoliation occurs in the interior of the canopy and at the bottom of the plant first when caused by target spot.³

Potential Yield Loss and Control

Defoliation of lower leaves is not likely to negatively impact yield potential and may help increase airflow within the canopy. Yield potential can be negatively impacted if the infection moves upward to the middle of the plant where leaves are actively supporting boll development, due to the potential for defoliation in the middle of the plant to cause boll abortion.¹ Infection at the top of the plant can lead to arrested boll development and unharvestable bolls.³

Rank growth contributes to infection. Controlling growth with a timely plant growth regulator application and scheduled irrigation is recommended. A fungicide application can help reduce infection and subsequent premature defoliation. Maximum control has been observed when strobilurin fungicides are applied between the first and third weeks of bloom. A second application should be considered if infection continues to spread three weeks after the initial fungicide application. However, yield response to fungicide application for target spot can be extremely variable. There can be as little as no yield advantage observed to as much as 200 lb/acre.¹



Figure 1. Target leaf spot lesions with concentric circles.

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Bacterial Blight/Angular Leaf Spot

Symptoms

Bacterial blight (*Xanthomonas citri* pv. *malvacearum*) tends to occur after prolonged rainfall. Symptoms begin as small water-soaked spots and progress into angular lesions defined by the veins of the leaf (Figure 2). Lesions eventually become black and can lead to premature defoliation. Infected bolls can form sunken, water-soaked lesions and may rot.¹

Diagnostic Notes

Bacterial blight has been observed across cotton-growing areas. Lesions caused by bacterial blight are often darker than those caused by other cotton foliar diseases, but bacterial blight lesions can also have a “shot-hole” appearance.² Boll lesions appear at the near the peduncle, at base of the boll, and may be hidden by the bract or the calyx.¹

Potential Yield Loss and Control

Plant tissues are infected via wounds caused by sandblasting, storm damage, or insect damage. Plants infected with bacterial blight can be further infected by opportunistic fungal pathogens that are present in the field.



Figure 2. Bacterial blight lesions defined by leaf veins.

This disease is caused by a bacterial pathogen, not a fungal pathogen, so fungicide application is not an effective means of control.¹ The pathogen can easily survive in infected crop residue, so destruction of residue, use of clean equipment, and crop rotation are recommended as management tools. The most effective management tactic is planting a cotton variety resistant to bacterial blight (Table 1).

Table 1. Bacterial blight ratings for Deltapine® brand cotton varieties.

Cotton Variety	Bacterial Blight Rating
DP 1646 B2XF	Moderately Resistant
DP 1725 B2XF	Susceptible
DP 1820 B3XF	Resistant
DP 1822 XF	Resistant
DP 1840 B3XF	Resistant
DP 1845 B3XF	Moderately Resistant
DP 1851 B3XF	Partially Resistant
DP 1908 B3XF	Resistant
DP 1909 XF	Resistant
DP 1948 B3XF	Resistant
DP 2012 B3XF	Resistant
DP 2020 B3XF	Resistant
DP 2022 B3XF	Resistant
DP 2038 B3XF	Resistant
DP 2044 B3XF	Resistant
DP 2055 B3XF	Susceptible
DP 2115 B3XF	Susceptible
DP 2123 B3XF	Moderately Susceptible
DP 2127 B3XF	Susceptible
DP 2131 B3TXF	Moderately Resistant
DP 2141NR B3XF	Susceptible
DP 2143NR B3XF	Susceptible
DP 2211 B3TXF	Susceptible
DP 2239 B3XF	Susceptible
DP 2317 B3TXF	Resistant
DP 2328 B3TXF	Moderately resistant
DP 2333 B3XF	Resistant
DP 2335 B3XF	Resistant
DP 2349NR B3XF	Resistant

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Alternaria Leaf Spot

Symptoms

Alternaria leaf spot (*Alternaria macrospora*) is usually attributed to potassium (K) deficiency in the leaves during boll fill as K is moved from the leaves to developing seeds.^{1,3} Small, brown, circular lesions with purple margins form on senescing leaves (Figure 3). The centers of the lesions become gray and can detach from the leaf, leaving a “shot-hole” appearance.^{1,2}

Diagnostic Notes

Alternaria and Stemphylium have similar foliar symptoms. However, Alternaria is typically observed in Texas and the Midsouth. Stemphylium can be found across cotton-growing areas but is more commonly found in the Southeast.²

Potential Yield Loss and Control

There are few regions or situations where Alternaria alone can lower yield potential enough to merit a fungicide application. The use of a fungicide application or a foliar K application in a curative manner has been largely unsuccessful.^{1,3}

Limiting stress on the crop can help prevent initial infection. *A. macrospora* can survive on undecomposed cotton residue, so incorporating any crop residue into the soil can help speed up decomposition and reduce subsequent inoculum production.³

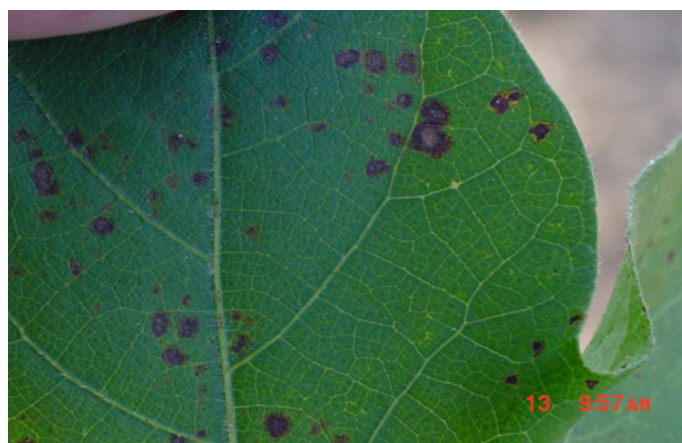


Figure 3. Alternaria leaf spot lesions with purple margins.

Stemphylium Leaf Spot

Symptoms

Like Alternaria leaf spot, Stemphylium leaf spot (*Stemphylium solani*) is usually related to K deficiency. Plants deficient in K have weaker leaf cells, making them more susceptible to fungal infections.⁴ Foliage quickly turns red and lesions appear with purple margins and ash-gray centers. Centers of lesions can detach and result in a “shot-hole” appearance.¹ Earlier in the growing season, infection may increase under droughty conditions as dry soils limit K uptake. Symptoms may also appear around the fourth week of bloom for plants with a heavy boll load as the demand for K can outpace available K.⁴

Diagnostic Notes

This disease can be found in all cotton-growing areas. Stemphylium leaf spot can be differentiated from target spot by examining where symptoms occur on the plant. Stemphylium is usually coupled with nutrient deficiency symptoms and found on the top of the plant first, while target spot occurs on green leaves and within the canopy.²

Potential Yield Loss and Control

Yield loss can be high for a cotton crop infected with Stemphylium, but this is due to the related stress from the nutrient deficiency that helped to initiate infection.² As such, fungicides have been shown to be ineffective.¹

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Cercospora Leaf Spot

Symptoms

Cercospora leaf spot (*Mycosphaerella gossypina*) lesions appear reddish at first and grow larger with light centers as the disease progresses. Infection is related to nutrient deficiency, and a disease complex may form with Alternaria and Stemphylium leaf spots.¹

Diagnostic Notes

This disease is present in all cotton-growing areas and can be difficult to differentiate from other leaf spots in the field. Cercospora leaf spot lesions are concentric, like those caused by target spot, and the lesion distributions is similar to Alternaria and Stemphylium leaf spots.² This disease may be more prevalent in poorer areas of a field.

Potential Yield Loss and Control

Lower yield and fiber quality can occur when this disease is part of a disease complex or when plants are under stress.² Fungicides are not considered to be effective in managing cercospora leaf spot, as this disease is a result of a nutrient deficiency.¹

Areolate Mildew

Symptoms

Areolate mildew (*Ramularia areola* syn. *Ramularia gossypii*) forms small lesions on leaves and a white mildew on the bottom of partial or entire leaves. Symptoms appear first on the lower canopy and move upward as the disease progresses. Areolate mildew lesions can become necrotic and early defoliation can occur in fields with substantial damage.^{2,5}

Diagnostic Notes

Areolate mildew can be mistaken for bacterial blight. However, areolate mildew includes a white, powdery growth on the underside of leaves that distinguishes it from bacterial blight.² Areolate mildew has been observed in Georgia, South Carolina, and North Carolina. Leaf sampling is recommended to confirm the diagnosis.⁵

Potential Yield Loss and Control

This disease usually occurs late in the growing season and does not largely impact yield potential.² It is recommended to apply a fungicide if the disease is prevalent in large areas of the field, the cotton crop is within the sixth week of bloom or earlier, and poor weather conditions are forecasted (cloudy and wet).⁵

Ascochyta Blight

Symptoms

Ascochyta blight (*Ascochyta gossypii* syn. *Phoma exigua*) lesions can develop on cotyledons, leaves, stems, and bolls. Lesions on leaves are round, white to light brown, and have dark margins (Figure 4). Stem cankers are reddish purple to black or gray. Ascochyta blight may also be referred to as “wet weather blight” due to extended cloudy, cool, wet conditions being conducive to disease development.²

Diagnostic Notes

Ascochyta blight has been observed across cotton-growing areas. Symptoms may resemble target spot, but this disease usually occurs earlier in the growing season.² Small, black, fruiting structures that resemble pepper may be found in the lesions.¹

Potential Yield Loss and Control

Ascochyta blight infection generally does not impact yield potential. However, young cotton can be more severely affected.² Fungicides can be effective at controlling this disease, but application is rarely warranted.¹



Figure 4. Symptoms of Ascochyta blight. Clemson University – USDA Cooperative Extension Slide Series, Bugwood.org.

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Sources:

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- ⁵ Thiessen, L. 2018. Areolate mildew confirmed in North Carolina. North Carolina State Extension. <https://plantpathology.ces.ncsu.edu/2018/08/areolate-mildew-confirmed-in-north-carolina/>

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