

Areolate Mildew of Cotton

► Areolate mildew, also known as *Ramularia* leaf spot, false mildew, and grey mildew, is an emerging cotton (*Gossypium* L.) disease in the southeastern United States. It is caused by two fungal pathogens, *Ramularia gossypii* and *R. pseudoglycines*. Both pathogens have a narrow host range but do infect all cultivated species in the *Gossypium* genus. Although areolate mildew was first reported in Auburn, Alabama, in 1890, the disease was of little importance to US cotton production until recently.

In 2018, areolate mildew re-emerged as a damaging disease in Alabama cotton, causing an estimated yield loss of more than 200 pounds of lint per acre in upland cotton. Currently, cotton grown in Alabama, Georgia, and the Florida Panhandle are most at risk for yield losses due to the prevalence of areolate mildew in those states. However, the disease does occur, at least sporadically, in Louisiana, Mississippi, North Carolina, and Tennessee.

Distribution

Areolate mildew is a warm, wet weather disease that occurs in central and south Alabama. Although it has been reported in the bordering state of Tennessee, the disease has not been an issue in cotton grown in north Alabama. Frequent afternoon showers in July and August favor early and rapid disease development. Outbreaks are more severe in irrigated cotton with high yield potential, especially in central Alabama.

Signs and Symptoms

Typically, areolate mildew first appears on the mature main stem and subtending leaves in the interior, lower canopy at canopy closure, 1 to 3 weeks after first bloom. However, the disease has also been observed first in the upper canopy on susceptible varieties. Initial lesions will be angular to irregularly shaped (3 to 4 millimeters wide) and yellow to green in color (figure 1). Lesion growth is restricted by leaf veins. As the disease progresses, a white powdery growth will appear, generally on the underside of the leaf, as tufts of white conidiophores and conidia develop (figure 2). As the pathogen sporulates, the disease will quickly spread throughout the canopy under favorable conditions. Lesions will eventually turn necrotic, resulting in premature defoliation (figure 3).

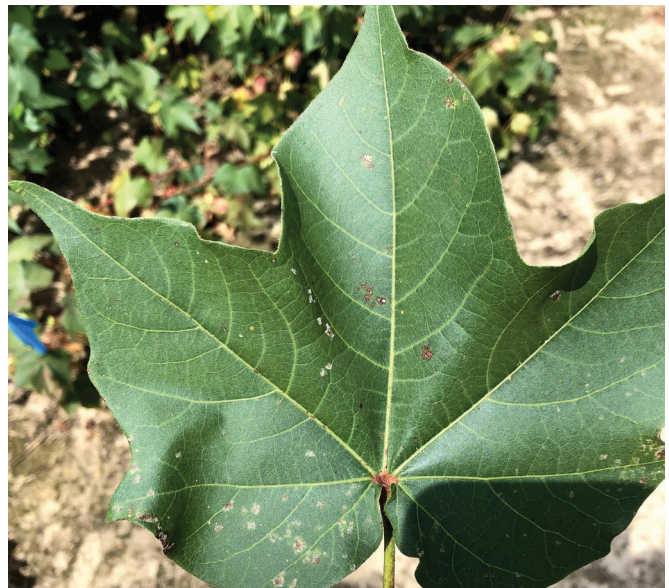


Figure 1. Yellow to green, angular to irregularly shaped areolate mildew lesions.



Figure 2. Tufts of conidiophores and conidia cause a white powdery mildew growth on the underside of leaves.



Figure 3. Premature defoliation caused by areolate mildew.

Disease Cycle and Epidemiology

Species of *Ramularia* that infect cotton can overwinter between production seasons on infested crop debris in the soil. Spores are spread from the previous year's crop debris to the lower canopy via rain splash, irrigation, or wind. Moderate temperatures between 68 and 86 degrees F and high relative humidity (above 80 percent) coupled with prolonged periods of leaf wetness (caused by frequent showers, heavy dew, irrigation, or fog) favor infection and disease development, especially late in the season.

Management Practices

If uncontrolled, areolate mildew can cause significant yield losses under favorable environmental conditions. The impact of disease can be minimized by adopting the following integrated pest management (IPM) practices:

- **Plant a Tolerant Cotton Variety.** Although none of the commercial cotton varieties are completely resistant to areolate mildew, they do vary in susceptibility. Susceptible cotton varieties are more at risk for areolate mildew–incited yield losses due to premature defoliation. Little data is currently available on variety tolerance of areolate mildew. However, more information about the performance of commercial cotton varieties in Alabama to foliar cotton diseases is available on the Auburn University

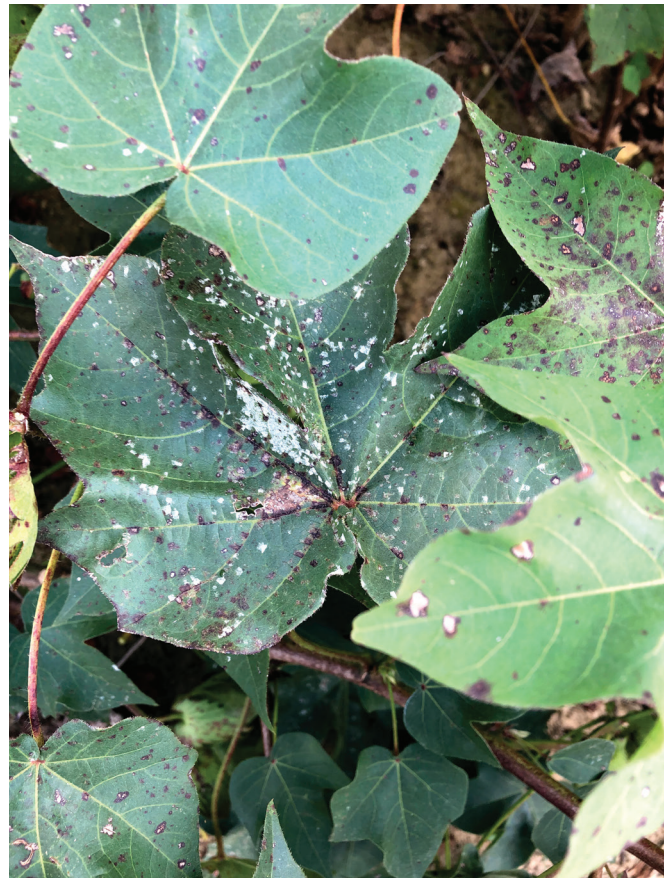


Figure 4. Cotton leaves with symptoms of both areolate mildew and Stemphylium leaf spot.

Variety Selection Platform on the Alabama Agricultural Experiment Station website. This tool allows users to look at small-plot research trial data and large-plot on-farm trial data, which include information on disease ratings, yield, and production practices. Because variety performance can vary due to location, soil type, weather conditions, and pest pressure, producers should plant multiple, high-yielding varieties that have performed well in their region.

- **Rotate to a Non-Host.** Since *Ramularia* spp. are limited to plant species in the *Gossypium* genus, crop rotation may help reduce the amount of initial inoculum and slow disease spread in the following season.
- **Reduce Plant Stress.** Consider testing fertility levels in fields before planting to ensure adequate levels of potassium and other nutrients, such as magnesium and calcium. Potassium deficiencies can lead to outbreaks of Stemphylium leaf spot, a secondary fungal disease associated with plant stress. Stemphylium leaf spot is known to occur with areolate mildew and target spot, which can cause

rapid defoliation of cotton plants (figure 4). Thus, cotton will be more at risk for yield losses when more than one disease is present. For more information, see “Stemphylium Leaf Spot of Cotton” (ANR-2944) on the Alabama Extension website at www.aces.edu.

- **Eliminate Crop Debris.** Destroying crop debris after harvest may help reduce inoculum carryover. Tilling crop debris as deep as possible into the soil while managing soil erosion is the most effective way to remove crop debris.
- **Scout Routinely and Apply Fungicides Preventively.** Producers should proactively scout for areolate mildew beginning the first week of bloom. Under conducive disease conditions, timely fungicide applications can reduce areolate mildew severity and provide yield protection, especially in high-yielding cotton. Fungicides can be applied for areolate mildew between the first and sixth week of bloom using the following recommendations:

Based on the growth stage, starting at the first or third week of bloom, followed by a second application at third or fifth week of bloom, respectively. Research at Auburn University has shown that one application applied between the third and fifth week of bloom is often enough to slow disease spread and protect yield.

At first sign of disease followed by a second application as needed. If areolate mildew is not present, producers may delay the first fungicide application but should continue scouting.

Several fungicides are labeled for use on cotton to manage areolate mildew. For specific fungicide recommendations and rates, please see “Cotton: Insect, Disease, and Weed Recommendations” (IPM-0415) on the Alabama Extension website at www.aces.edu.”

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