

## Assessing Risk to Target Spot in Georgia

A draft of a risk-management tool to be assessed and refined in Georgia/Revised 12 February 2013

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Factor with the **HIGHEST impact** on increased risk to target spot:

- a. **Location of the field.** The risk to significant outbreaks of target spot seem greatest in SW Georgia, SE Alabama and NW Florida. 25 pts
- b. **Location of the field.** Field is located in central and SE Georgia. 15 pts
- c. **Location of the field.** Field is located in eastern Georgia. 5 pts

Factors with **MODERATE impact** on increased risk to target spot:

1. **Field History.** Target spot is likely to occur again if fields where it has been severe in the past if environmental conditions are favorable.
  - a. **Target spot has been severe** in the field in the past. 15 pts
  - b. **Target spot has been observed** but has not been severe. 5 pts
  - c. **Target spot has not been observed.** 0 pts
2. **Rank cotton growth.** The development and spread of target spot seems closely tied to extended periods of leaf wetness. Foliage within the dense canopy of cotton stays wet longer and is thus more prone to target spot.
  - a. **Rank cotton with dense canopy.** 15 pts
  - b. **Cotton with complete closure but growth well managed.** 5 pts
  - c. **Cotton with open canopy and good airflow.** 0 pts
3. **Irrigation.** As above, irrigation can both improve the growth of the cotton plants and extend periods of leaf wetness, thereby increasing the risk to target spot.
  - a. **Cotton irrigated during day, greatly extending dew period from previous night.** 10 pts
  - b. **Cotton is irrigated at night or early morning to minimize leaf wetness period.** 5 pts
  - c. **Cotton is not irrigated.** 0 pts
4. **Extended periods of rainfall and cloudy weather.** Such conditions create conditions where disease is favored.
  - a. **Frequent periods of extended rainfall of cloudy conditions.** 10 pts
  - b. **Rainfall events "normal" for the season.** 5 pts
  - c. **Growing season is extremely dry.** 0 pts

Factors with **LOW impact** on increased risk to target spot:

1. **Tillage.** Spores of the target spot pathogen, *Corynespora cassiicola*, will survive in the crop debris from previous cotton crops. Spore survival is expected to be longer in reduced-tillage conditions and spores may also be splashed to cotton leaves easier from such debris.
  - a. **Conservation tillage/reduced tillage.** 5 pts
  - b. **Conventional tillage with deep turning.** 0 pts
2. **Crop rotation.** Although this remains to be proven, it is likely that target spot on cotton will be more severe in fields where cotton is planted behind cotton or in in short rotations. This is because the spores of the pathogen will survive among the debris from recent cotton crops.
  - a. **Cotton planted behind cotton.** 5 points
  - b. **At least one year of another crop between cotton crops.** 0 points.

Factor that **MAY have impact** on risk to target spot. **Variety Selection.**

**Variety selection.** It is likely that some varieties of cotton may be more susceptible to target spot than are others. However it is not clear whether such an increase in susceptibility is because the pathogen can more easily infect the leaves of the cotton plant or because of the growth habit of the variety tends to be more-rank and thus prone to longer periods of leaf wetness. Also, the exact relationship between defoliation and yield loss is not completely understood. For example a variety with more defoliation than another variety may not necessarily yield less.

#### YOUR RISK

**High Risk:** Growers with the greatest risk to target spot and most likely to see some benefit to use of a fungicide program are those with a total risk of **40 points or more**.

**Moderate Risk:** Growers at **moderate risk to target spot** and could benefit from the use of a fungicide are at risk levels from **25 to 35 points**.

**Low Risk:** Growers with the **least risk to target spot** are those with risk levels below **25 points**.

**Timing of fungicide applications:** Growers are advised to begin scouting their fields at the approach of first bloom to determine if target spot is present in the crop. From research conducted in Georgia, the optimum timing for an initial fungicide application is sometime between the first and third week of bloom; an additional fungicide application may be needed approximately 3 weeks after the first application.

**Target Spot:** Target spot is caused by the fungal pathogen *Corynespora cassiicola* and is most severe during periods of extended leaf wetness. Target spot is easily identified by the presence of marble-size spots on a leaf that frequently demonstrate a pattern of concentric rings. Infection and premature defoliation typically begin in the lower leaves of the plant and progress up the plant. Significant defoliation can occur very quickly after initial detection of the disease. Defoliated leaves typically retain their green or green-yellow color. Lesions are also found on the boll bracts and possibly on the bolls themselves. Fungicides have been shown to aide in the management of this disease.

**Stemphylium Leaf Spot:** Stemphylium leaf spot is caused by the fungal pathogen *Stemphylium solani* ; however the underlying cause of this disease is actually the result of a deficiency in potassium in the plant. This disease is analogous to Alternaria leaf spot (*Alternaria macrospora*) in Texas. Symptoms of this disease include a sudden reddening of the foliage of the cotton plant and the rapid appearance of numerous spots with ashy-gray centers and a dark purple margin. The centers of the spots frequently detach from the leaf giving the leaf a shot-hole appearance. The use of fungicides to manage Stemphylium and Alternaria leaf spot diseases has been largely unsuccessful.

**Cercospora Leaf Spot:** Like Stemphylium leaf spot and Alternaria leaf spot, Cercospora leaf spot (*Cercospora gossypina*) is often linked to a nutrient deficiency in the cotton crop and may form a disease complex with Alternaria macrospora and Stemphylium solani. Spots begin as small, reddish lesions that larger circular lesions with light brown centers; zonation similar to that of target spot may be observed. As this disease is associated with nutrient deficiencies, fungicides are not considered to be an effective control measure.

**Areolate Mildew:** Areaolate mildew, caused by the fungal pathogen *Ramularia areola*, is of limited importance in Georgia and is generally confined to the southeastern region of the state, especially during periods of abundant rainfall. The disease is easily identified by the presence of abundant white-to-gray sporulation on the underside of the affected leaves. The affected leaves often drop prematurely resulting in significant defoliation. This disease can be effectively managed with the use of fungicides, especially strobilurin fungicides; however it is not clear at this time how much yield loss is associated with the disease.

**Ascochyta (wet weather) blight:** Ascochyta blight, caused by *Ascochyta gossypii*, is a disease of sporadic importance in Georgia, especially during periods of cool weather with abundant rainfall early in the season. Hence, young plants are most often affected. The spots in the field can be tentatively diagnosed by the presence of tan lesions bordered by a dark ring; embedded in the lesion are dark fungal structures that appear like pepper grains. Though use of fungicides for effective management has been reported, such is generally considered unnecessary in Georgia. This disease tends to become of little significance as conditions become drier.

**Angular (bacteria) Leaf Spot:** Angular leaf spot is caused by the bacterial pathogen *Xanthomonas campestris* and is of limited importance to cotton producers in Georgia. The disease is most common in periods of extended rainfall. Lesions/spots on the leaves are quite distinctive as they are defined by the veins on the leaf, thus creating the “angular” appearance. This pathogen can also cause water-soaked lesions on the bolls themselves leading to rot. As this is a bacterial pathogen, use of fungicides is not an effective management tool. This pathogen can be seed transmitted.