

Field Crops

Cotton

DISEASE

Symptoms, source of inoculum, and management of cotton diseases.

Bacterial Blight (*Xanthomonas citri* pv. *malvacearum*)

Symptoms: On seedlings lesions appear as small, water-soaked irregular spots eventually turning brown; hypocotyls will appear black with elongated lesions girdling the stem and causing death. Foliar symptoms on older plants consist of angular lesions that initially appear water-soaked and later turn brown to blackish purple, occasionally following main leaf veins and rarely with yellow halos. Petioles and stems may appear blackened, and significant defoliation may occur. The bacterium may cause boll blight, which begins with round, water-soaked lesions eventually turning brown to black and allowing entry of secondary organisms that cause rot.

Source of Inoculum: The primary source of inoculum is seed, and the secondary source is cotton debris.

Management: Use acid-delinted seed. Destroy cotton debris, rotate to another crop, and/or use resistant varieties. The pathogen may be moved from field-to-field by equipment or insects. Overhead irrigation or excessive rainfall along with windy conditions may exacerbate disease. Infected bolls will have infected seed, which serves as primary inoculum.

Boll Rots (many fungi and bacteria)

Symptoms: There are a wide range of symptoms since there are many organisms involved and many stages of boll development when damage may occur. Discolored, sunken areas may develop on the boll surface. Seed and fiber may be damaged without surface lesions on the boll. Fiber may be stained.

Source of Inoculum: Organisms causing boll rots may be carried over in the soil, on crop debris, or on the seed coat.

Management: Avoid rank growth and control insects during boll development. Plant-growth regulators may be helpful in reducing rank growth and, in turn, boll rot incidence.

Fusarium Wilt (*Fusarium* spp.)

Symptoms: Plants usually are stunted and may fruit early. Leaves may turn yellow, wilt, and drop. Brown to dark-brown discoloration occurs on woody tissue just beneath the bark. Disease is more severe on sandy soils during hot weather when root-knot or reniform nematodes are present. (See root-knot nematode section.)

Source of Inoculum: The pathogen lives indefinitely in soil along with nematodes.

Management: Use tolerant varieties. Most recommended varieties exhibit tolerance to Fusarium wilt. Under more severe conditions, use recommended nematicides.

Leaf Spot Complex (*Alternaria* spp., *Cercospora gossypina*, *Stemphylium* spp., *Ascochyta* spp., and other fungi)

Symptoms: Brown to red to tan circular lesions on leaves that may occur at any stage. Lesions may be up to ¾ inch, and margins usually appear reddish to purple. As the diseases progress, centers of lesions may appear sooty due to sporulation of the pathogens and eventually fall away resulting in a “shothole” appearance of foliage. In cases of heavy infestation, lesions may overlap and cause premature defoliation resulting in decreased lint yields.

Source of Inoculum: Fungi overwinter in previous crop/weed debris.

Management: Plow under infected plant debris. Plant high-quality, acid-delinted, fungicide-treated seed. Avoid nutrient stresses (particularly Potassium), drought stress, other pest damage, and/or herbicide injury. Foliar fungicides may reduce incidence and severity, but economic benefit is very unlikely.

Reniform Nematodes (*Rotylenchulus reniformis*)

Symptoms: These nematodes cause severe stunting, reduced boll set, and tight, locked bolls. Root systems are restricted but not knotted. May be found in mixed to heavy soil.

Source of Inoculum: Reniform nematodes live from year to year in the soil.

Management: Apply nematicides. Refer to Nematode Management Field Crops section. There are very few resistant varieties. Rotate to a non-host crop.

Root Knot Nematodes (*Meloidogyne incognita*)

Symptoms: Root systems are knotted or galled. Plants are stunted, slow growing, and low yielding. Usually associated with a high incidence of Fusarium wilt. Damage from RKN is most severe on sandy soils. (See Fusarium wilt above.)

Source of Inoculum: Root-knot nematodes live from year to year in the soil as eggs, juveniles, or adults.

Management: Use resistant varieties. Apply nematicides. Refer to table on nematode control in field crops. Rotate to a resistant or non-host crop.

Seedling Diseases (*Rhizoctonia* spp., *Pythium* spp., *Fusarium* spp., and many other fungi)

Symptoms: Loss before emergence is characterized by rotting of the seed or seedling. After emergence, affected seedlings have dark lesions on the stem, often girdling and extending downward into the root system. Older plants have reddish-brown, sunken lesions near the soil line.

Field Crops

Cotton

Source of Inoculum: Some of the organisms causing seed rot and seedling diseases may be carried on the seed coat, while others persist in the soil.

Management: Use only high-quality seed. Plant seed only when soil temperatures at a 4-inch depth reach 68° F for three to four days. Plant fungicide-treated seed to a weed-free seedbed at proper depth for soil type and weather conditions along with adequate drainage.

Target Spot (*Corynespora cassiicola*)

Symptoms: Brown to tan circular lesions on leaves usually beginning low after canopy closure. Lesions usually will not have reddish to purple margins when found low in the canopy and will have a “bullseye” appearance. Target spot lesions are usually larger than other leaf spot lesions. The disease progresses from low in the canopy upward, and severe defoliation may occur in a relatively short period of time, particularly during warm, rainy periods. During severe epidemics, target spot lesions in the upper canopy are smaller, do not have a target-like pattern, and may be confused with the cotton leaf spot complex.

Source of Inoculum: The pathogen overwinters in crop debris.

Management: Destroy debris. Some varieties may tolerate target spot better than others. Avoid excessive nitrogen and rank plant growth (apply PGRs as necessary). Scout closely prior to and after canopy closure. Scout nearby soybeans for target spot. Foliar fungicides may lower disease incidence and in severe cases preserve yield. Fungicide coverage is key, and applications should be made by ground with a minimum total volume of 15 gal/A with high pressure using hollow cone or flat fan nozzles. Refer to Table 1.

Verticillium Wilt (*Verticillium* spp.)

Symptoms: Leaf margins and between veins have pale yellow markings. Severely affected plants shed the young bolls. Light brown discoloration occurs in the interior woody tissue of the stem with little to no discoloration just beneath the bark. Disease occurs in cool weather with or without nematodes.

Source of Inoculum: The pathogen lives indefinitely in the soil.

Management: Rotate with soybeans, sorghum, or small grains.

Field Crops Cotton

Table 1. Foliar fungicides labeled for use in Louisiana cotton.

Fungicide ¹	Mode of Action Group ²	Use Rate (fl oz/A)	Target Disease(s)/Pathogen(s) ³
Amistar Top (Syngenta)	11+3	8-11.6	Alternaria leaf spot (<i>Alternaria</i> spp.), Anthracnose (<i>Glomerella gossypii</i>), Areolate mildew (<i>Ramularia gossypii</i>), Ascochyta blight (<i>A. gossypii</i>), boll rots (<i>Ascochyta gossypii</i> , <i>Alternaria</i> spp., <i>Diplodia</i> spp., <i>Phoma</i> spp.), cotton rust (<i>Puccinia schedonnardi</i>), Diplodia boll rot (<i>Diplodia</i> spp.), hard lock (<i>Fusarium verticillioides</i>), leafspots and blights (<i>Alternaria</i> spp., <i>Ascochyta gossypii</i> , <i>Cercospora</i> spp., <i>Stemphylium</i> spp.), Southwestern cotton rust (<i>Puccinia cacabata</i> , <i>Puccinia</i> spp.) Stemphylium leaf spot (<i>Stemphylium</i> spp.), target spot (<i>Corynespora cassiicola</i>)
Aproach	11	6-12	Stemphylium leaf spot (<i>Stemphylium</i> spp.)
Delaro (Bayer)	11+3	8-12	Target spot (<i>Corynespora cassiicola</i>), rust (<i>Puccinia</i> spp.)
Elatus (Syngenta)	11+7	5-7.3	Ascochyta blight (<i>A. gossypii</i>), Target spot (<i>Corynespora cassiicola</i>)
Headline (BASF)	11	6-12	Alternaria leaf spot/boll rot (<i>Alternaria</i> spp.), Anthracnose/boll rot (<i>Glomerella</i> spp.), Ascochyta blight/boll rot (<i>Ascochyta</i> spp.), Cercospora blight and leaf spot (<i>Cercospora</i> spp.), Diplodia boll rot (<i>Diplodia</i> spp.), Hard lock/boll rot (<i>Fusarium</i> spp.), Phoma blight, boll rot (<i>Phoma</i> spp.), Stemphylium leaf spot (<i>Stemphylium</i> spp.)
Miravis Top (Syngenta)	7+3	13.7	Alternaria leaf spot (<i>Alternaria</i> spp.), Areolate mildew (<i>Ramularia gossypii</i>), Ascochyta blight (<i>A. gossypii</i>), boll rots (<i>Ascochyta gossypii</i> , <i>Alternaria</i> spp., <i>Diplodia</i> spp., <i>Phoma</i> spp.), hard lock (<i>Fusarium verticillioides</i>), leafspots and blights (<i>Alternaria</i> spp., <i>Ascochyta gossypii</i> , <i>Cercospora</i> spp., <i>Stemphylium</i> spp.), target spot (<i>Corynespora cassiicola</i>)
Priaxor (BASF)	7+11	4-8	Same as above plus Target spot/ <i>Corynespora</i> leaf spot (<i>Corynespora cassiicola</i>)
Proline (Bayer)	3	5-5.7	Target spot (<i>Corynespora cassiicola</i>)
Quadris (Syngenta)⁴	11	6-9	Same as Amistar Top.
Revytek (BASF)	3+7+11	8-15	Same as Priaxor plus Rust (<i>Phakopsora</i> and <i>Puccinia</i> spp.)
Topguard (FMC)	3	7-14	Alternaria leaf spot/boll rot (<i>Alternaria</i> spp.), anthracnose/boll rot (<i>Glomerella</i> spp.), Areolate mildew (<i>Ramularia gossypii</i>), Ascochyta blight/boll rot (<i>Ascochyta gossypii</i>), Cercospora blight and leaf spot (<i>Cercospora</i> spp.), Diplodia boll rot (<i>Diplodia</i> spp.), Fusarium boll rot (<i>Fusarium</i> spp.), hard lock (<i>Fusarium verticillioides</i>), Phoma blight/boll rot (<i>Phoma</i> spp.), Stemphylium leaf spot (<i>Stemphylium</i> spp.), target spot (<i>Corynespora cassiicola</i>)
Topguard EQ (FMC)	11+3	5-7	Same as Topguard.
Twinline (BASF)	3+11	7-8.5 (10-12 for Target spot)	Same as Priaxor.
Vertisan (Corteva)	7	16-24	Boll rot (<i>Diplodia</i> spp., <i>Fusarium</i> spp.), Foliar disease complex, Alternaria leaf and stem spots (<i>Alternaria</i> spp.), Cercospora leaf spot (<i>Cercospora</i> spp.), Stemphylium leaf spot (<i>Stemphylium</i> spp.), Hard lock (<i>Fusarium</i> spp.), Soil-borne diseases, Seedling and root rot (<i>Rhizoctonia solani</i>)

¹Reference to commercial or trade names is made with the understanding that no discrimination or endorsement of a particular product is implied by LSU or the LSU AgCenter. Multiple biofungicides, generic tebuconazoles, and other triazoles exist on the market and are not included because these products have not been tested in Louisiana cotton. This list is not all-inclusive; generic pre-mixes that are labeled for use in cotton may be available locally.

²Mode of action groups are determined by the Fungicide Resistance Action Committee (FRAC).

³Consult product label for disease pressure or additional target pathogens.

⁴Multiple generics are available with the same active ingredient.

The cotton section was revised September 2022 by Dr. Trey Price.