Early-Season Diseases in Cotton

- Cotton seedling diseases, caused by several different soil fungi, can significantly reduce yield potential.
- Disease incidence and impact can be affected by environmental conditions, soil conditions, and insect and nematode pressure.
- Good management practices, in addition to high-quality seed with fungicide seed treatments can significantly reduce damage from early-season diseases.

Susceptibility
Seedling diseases occur in all soil types and mostly favor wet and poorly-drained soil conditions. Conservation tillage, compacted soil, planting without beds, and planting too deep may also contribute to a higher incidence of disease. In addition, nematode and thrips damage can delay seedling development and enhance damping-off diseases caused by various fungi.¹

Seedling Diseases
Several species of fungi, including *Rhizoctonia solani*, *Pythium* spp., *Phoma exigua* (*Ascochyta gossypii*), and *Fusarium* spp. can cause cotton seedling diseases. Fungi that cause seedling diseases may either be soil-borne or seed-borne.² The fungi can attack the seed prior or during germination, or they may attack seedlings after emergence. Disease symptoms include seed decay, decay of the seedling before emergence, delayed emergence, partial or complete girdling of the emerged seedling stems, and seedling root rot. Damaged seedlings are pale, stunted, slower growing, and sometimes die within a few days after emergence. The taproot is often destroyed, leaving only shallow-growing lateral roots to support the plant. Reddish-brown, sunken lesions at or below ground level damage may enlarge, girdle the stem, and cause it to shrivel. These diseases usually result in uneven, slow-growing stands with skips in the rows.¹

*Rhizoctonia solani.* Damage is often described as “sore-shin”. Plants injured by sand blasting are particularly susceptible to this pathogen. This fungal disease is less dependant on wet, cool conditions than other seedling diseases, and can be found in either wet or dry soils with warmer soil temperatures. Reddish-brown lesions girdling the stem at the soil line indicates the presence of *Rhizoctonia*. If the seedling survives, the stem will be weakened at the site of the lesion and plant growth may be stunted (Figure 1).

*Pythium* spp. These fungi are classified as water molds, and produce spores that move in the soil water. These fungi are more commonly problematic in soils that have remained saturated for several days. Cotton seedlings infected with *Pythium* usually have a water-soaked, almost translucent lesion at the soil line and the outer root layer can be peeled back, creating a ‘wire root’ appearance (Figure 2).

*Phoma exigua* (*Ascochyta gossypii*). Damage of damping off often occurs post-emergence. Cotyledons may turn brown and die prematurely. Disease may be more common in foggy conditions and when night temperatures are in the 50’s.¹,² *A. gossypii* may also be referred to as Wet Weather Blight or Cotton Stem Canker. This fungus may occur throughout the growing season, but can cause more damage to young cotton plants. In the most serious cases, the fungus attacks the hypocotyl, killing affected plants.
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and possibly destroying large areas of fields (Figure 3). The disease is usually sporadic and plants may recover once warm, dry weather returns.3

**Fusarium spp.** There are several species of Fusarium that infect cotton seedlings. Fusarium can regularly be found in conjunction with root-knot nematode infestations, as nematodes can injure young roots and increase severity of disease. Plants may be stunted with interveinal chlorosis in the leaves, but the most obvious symptom is a group of wilted plants in adequate soil moisture. Damage to the vascular system limits soil moisture and nutrient uptake, eventually causing plant death. Infected plant stems may be carefully sliced open to reveal damaged, brown vascular tissue (Figure 4).2

### Management Considerations

Seedling disease management begins with planting high-quality seed in favorable conditions for seedling germination and development. Fungicide seed treatments, as well as in-furrow fungicides can also help protect seedlings from diseases. Cotton should be scouted for early-season disease symptoms at the same time the crop is scouted for early-season insect damage.4

There are several management practices that can help reduce the likelihood of early-season disease problems in cotton. Prior to planting, be sure the soil pH is within the 6.0 to 6.5 range. Also, apply fertilizer according to soil test results to help seedlings to germinate quickly. Also, avoidance of chemical injury from improper application of pre-plant herbicides should be avoided to reduce stress on emerging seedlings.

Planting should occur when the temperature at the 4-inch soil depth is above 65°F, and when 5-day post-planting weather forecasts do not predict a decrease in air temperature. Seed should be planted on raised beds to help increase the likelihood of adequate soil temperatures and drainage. It is important to mitigate potential disease risk on soils that cannot be bedded, such as those in a conservation tillage program. Do not plant seed too deep, as this can extend the time required for seedling emergence and opportunity for disease.4

Choosing high-quality seed with standard germination test results of at least 80%, or cool germination test results of above 70% can help provide a strong start for seedling growth.2 In addition, standard fungicide seed treatments included with all commercially-sold cotton seed can help provide a base level of protection from cotton seedling diseases. Seed treatment fungicides may be either protectants or systemics. Protectant fungicides protect the seed from possible disease carried on the seed or disease in the soil that may be directly in contact with the seed. Systemic fungicides are taken up by the seedling as it continues to grow, and can provide protection from certain types of preemergence and postemergence damping off. Most commercial cotton seed sold is pre-treated with both protectant and systemic fungicides. Fungicide seed treatments can provide cotton seedlings with adequate broad-spectrum protection from early-season diseases. Growers should also consider including premium seed treatment packages with higher use rates than what comes standard in a low base rate to help provide more complete and consistent protection in situations with high disease pressure.

For additional agronomic information, please contact your local seed representative. Developed in partnership with Technology, Development, & Agronomy by Monsanto.

### Sources:


Web sources verified 04/22/15.