Corn Seedling Diseases

- Cool, wet soil conditions can delay germination and emergence and predispose corn seedlings to infection by several species of fungi.
- Symptoms of corn seedling blights and root rots can be similar, making a field diagnosis difficult.
- Broad spectrum fungicide seed treatments offer protection against seedling disease pathogens, but do not eliminate the risk of disease when environmental conditions favorable for disease development exist.

Many different fungi are responsible for causing seedling diseases in corn. Identification of specific seedling blights and root rots based on symptomology can be difficult because different pathogens often cause similar symptoms. Damage to seeds and seedlings from nematodes, root-feeding insects, environmental stresses, and herbicide injury can also cause similar symptoms and complicate diagnosis. Microscopic examination at a plant diagnosis clinic is the most reliable method to diagnose a specific disease.

It is not uncommon to isolate multiple root-infecting fungi from one plant sample. Several common pathogenic fungi include: Fusarium, Penicillium, Pythium, and Rhizoctonia. Other fungi such as Aspergillus, Nigrospora, and Trichoderma may also cause seedling diseases in corn.

Common Symptoms

Typical below-ground symptoms of seedling disease include rotted seed that is soft and brown, rotted roots that may have a wet and slimy appearance, and a mesocotyl (region between the seed and permanent root system) with brown lesions or soft and water-soaked tissue. Above-ground symptoms include damping-off after emergence and seedlings that turn yellow, wilt, and die.

Common Pathogens

Fusarium. At least six Fusarium species have been identified that cause seedling diseases and root rots in corn. Plant susceptibility to root rot increases when plants are under stress or injured by herbicide applications. Infected plants can have tan to reddish brown lesions and the root or mesocotyl may shrivel (Figure 1). Symptoms on the root range from very slight brown discoloration to dark black, completely rotted roots. This disease can occur under a wide range of temperature and moisture conditions. Root rots occurring after the seedling stage are often caused by Fusarium. Fusarium root rot can move into the base of the corn plant, resulting in crown and stalk rot at later growth stages.

Penicillium. The roots and mesocotyl of Penicillium infected plants may be discolored and rotted. Sometimes, a blue-green fungal growth can be seen on infected seeds. Above-ground symptoms of this seedling blight include browning of leaf tips, which can occur as late as the V3 to V5 growth stages. Entire infected plants may turn yellow and die, or remain discolored and stunted throughout the growing season (Figure 2). Penicillium tends to infect plants that have yet to develop nodal root systems. This fungus is favored by high temperatures, which can inhibit other fungi.

Figure 1. Symptoms caused by Fusarium including rotted mesocotyl (indicated by arrow).

Figure 2. Corn seedling with symptoms of seedling blight caused by Penicillium. Courtesy of William M. Brown Jr., Bugwood.org.
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**Pythium.** Several species of Pythium can rot the seed prior to germination or infect young seedlings before or after emergence (Figure 3). Pythium is one of the most common fungi associated with seed rot and seedling blight of corn. This fungus is favored by high moisture and low temperatures and requires wet soils to produce infecting spores. Symptoms include dark, slimy lesions that cause the root or mesocotyl to shrivel. The outer cortex of the root may be rotted while the inner part, or stele, remains white and intact (Figure 4). Pythium can infect anytime between planting and midseason, but is primarily a seedling problem (Figure 5).

**Rhizoctonia.** The most distinctive symptoms are reddish brown sunken cankers found on crown and brace roots of large plants. This can lead to crown rot and brace root rot on older plants and may eventually lead to lodging due to a poor root system. Initial symptoms are brown lesions on the mesocotyl and roots of seedlings and young plants. These lesions may develop into the distinct reddish brown sunken cankers. Plants may be stunted or chlorotic, but often there are no above-ground symptoms. Rhizoctonia can infect corn roots between 46° to 82° F. This disease tends to be more severe in irrigated corn.

**Disease Management**

**Cultural Practices.** Wet and cool soil temperatures (less than 50° to 55° F) can delay seed germination and emergence and predispose corn seedlings to disease. Seedlings become more susceptible to infection the longer a seed is in the ground before emergence and the more stress germinating corn endures. Management options are generally the same for all corn seedling diseases. Plant high quality seed at the appropriate planting depth and soil conditions to promote rapid germination and emergence. Fields that have a tendency to stay wet or have a history of seedling disease should not be targeted for early planting; these fields should be planted slightly later in the season when soil temperatures are more favorable for plant growth. Avoid mechanical injury to the seed and herbicide injury, as these may influence the occurrence of seedling diseases.

**Seed Treatments.** Most corn seed is treated with fungicide seed treatments, often with multiple active ingredients. These products can provide a level of protection against seedling blight pathogens, but may not eliminate all threats under severe environmental conditions that favor infection. All seed treatments have a limited period of activity, which usually lasts for about a month after planting. Broad-spectrum seed treatments can help minimize the risk of corn seedling disease development.

**Sources**


Web sources verified 2/6/15. 140313060656

For additional agronomic information, please contact your local seed representative.

**Individual results may vary,** and performance may vary from location to location and from year to year. This result may not be an indicator of results you may obtain as local growing, soil and weather conditions may vary. Growers should evaluate data from multiple locations and years whenever possible.

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