

Factors That Promote Corn Disease

Corn diseases occur every year and can be a major factor limiting corn yield potential. All growth stages and plant parts are susceptible to infection. Corn diseases can cause leaf spots, blights, or wilts that result in premature death of the plant. They can also cause harvest and storage losses and affect grain quality.

There are many types of pathogens that can infect plants and cause diseases resulting in injury and plant loss. These pathogens range from causing seed and seedling diseases, to foliar diseases, to stalk rots and ear rots. Additionally, the pathogens themselves can be microscopic organisms including nematodes, fungi, viruses, and bacteria.

A primary principle of plant disease—or any disease for that matter—is the disease triangle, which states that three things must occur for a pathogen to cause a disease. These three things are 1.) that the pathogen must be present, 2.) the host must be susceptible, and 3.) favorable environmental conditions must exist for the development of the disease (Figure 1). Increasing the amount of time spent in environmental conditions favorable for specific diseases also increases the overall disease pressure. The key to managing any plant disease is to eliminate at least one of the three factors of the disease triangle. As many management tactics and strategies are pathogen specific, it is important to accurately identify the pathogen causing the disease before making management decisions.

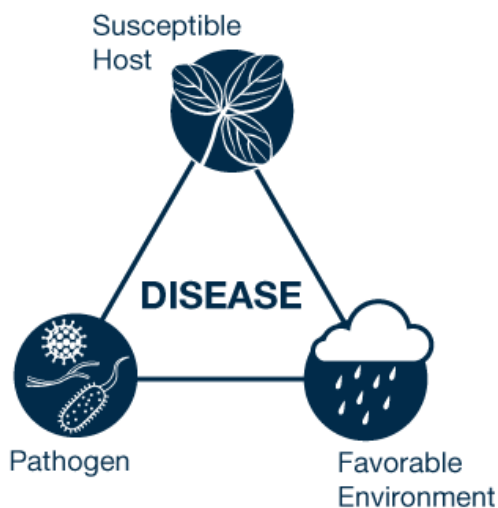


Figure 1. Disease triangle. Disease only occurs when all three factors are present.

Seed and Seedling Diseases

Seed and seedling diseases (Figure 2) are usually favored by wet soil and cool soil temperatures (below 50 °F, 10 °C). Fungi can cause seedling blights, are usually present in the soil, and can reside in the soil for many years. Most seed corn is treated with fungicides that provide protection against most soilborne diseases. Planting into a well-prepared seedbed with moist, warm soil (above 55 °F, 12 °C) reduces the risk of seed and seedling diseases. See [SEEDLING DISEASES OF CORN](#) for more information.



Figure 2. Symptoms of *Pythium* root rot on corn seedlings at different growth stages.

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Foliar Diseases

Foliar diseases vary from field to field and year to year depending on environmental conditions, tillage practices, crop rotation, and corn-product susceptibility. In general, moderate temperatures and high moisture (rain or heavy dew) usually favor leaf diseases. More than one disease may be visible on the same plant (Figure 3). Foliar diseases are usually most problematic after tasseling and during grain fill, although all foliar diseases can occur earlier.

Control measures include selection of tolerant corn products, tillage and crop rotation to reduce overwintering pathogen inocula, and timely application of foliar fungicides. See [CORN LEAF DISEASES](#) for more information.



Figure 3. Symptoms of tar spot and Northern corn leaf blight on the same leaf. Image courtesy of Gabriel Rennberger.

Stalk Rots

Late-season stalk rots are common, particularly when stress—such as drought—occurs during the growing season. Most losses from stalk rots involve lost time at harvest and loss of grain, which becomes unharvestable due to the damaged stalks (Figure 4). Several different fungi and bacteria cause stalk rots as part of a group of microorganisms that decompose dead plant material in the soil. These organisms survive from one growing season to the next in soil or on infested corn residue.

Drought conditions, extended periods of cloudy weather, temperature stress, hail damage, insect damage, nutrient deficiency, leaf loss from foliar diseases, and other stresses can all be associated with an increase in stalk rot.

Prevention of stalk rot is often unsuccessful, as infection by stalk rot organisms is often dependent on factors outside of the producer's control. However, selecting of corn products with good stalk health and lodging characteristics; maintaining weed, disease, and insect control; practicing proper fertility; planting at appropriate seeding rates for the corn product; and minimizing stress during the reproductive and grain fill stages may reduce the likelihood of stalk rot. For more information see [LATE SEASON CORN DISEASES ID](#).



Figure 4. Corn stalk lodging in the fall, due to cannibalization and stalk rots.

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Ear Rots

Several fungi cause corn ear and kernel rot diseases that can reduce yield potential, feed quality, and grain value (Figure 5). Most of the ear rots are more prevalent when the amount of rainfall is above average from silking to harvest. One exception is *Aspergillus flavus*, a pathogen which is favored by drought stress during pollination and by warm temperatures as kernels mature. For all ear rots, damage tends to be more severe on ears with insect, bird, or hail damage. In general, ears that are well covered by husks tend to have less rot than upright ears with open husks. However, Gibberella ear rot seems more severe on ears with tight husks. Some fungi that can cause ear rots—particularly *Penicillium*, *Fusarium*, and *Aspergillus*—can also cause extensive damage to stored grain that is not kept at the proper moisture content and temperature.

Corn product selection is the primary management option for ear rots. While there are labeled fungicides for ear rots, properly timing their application is critical, and it is difficult to get adequate coverage in the ear region of the corn plant. Early detection of ear rots allows harvest to be prioritized in affected fields and helps reduce the amount of grain affected by the symptoms of the disease.



Figure 5. Fungi that can cause ear rots, such as *Gibberella*, can reduce yield potential, feed quality, and grain value.

Nematodes

Nematodes attack corn roots (Figure 6), thereby limiting root development and restricting water and nutrient uptake. There are numerous species of nematodes, including the dagger, lance, lesion, needle, stubby-root, and stunt nematodes. Common symptoms of nematode injuries include yellowing foliage, stunting, swelling, and/or browning of roots. Above-ground symptoms of nematode injury are almost never diagnostic, and usually mimic symptoms of nutrient deficiencies. For more information, see [Parasitic Nematodes in Corn](#).

Corn plants are rarely killed by nematodes. Symptoms of nematode feeding are most noticeable when environmental conditions cause plant stress, though nematode injuries can cause yield loss even when plants do not exhibit above-ground symptoms. To identify nematodes, soil and root samples must be taken and submitted to a testing facility. Treatment recommendations can be made after test results confirm the nematode species and population density. Management options vary by species, but include crop rotation, minimizing plant stresses, seed treatments, and nematicides.



Figure 6. Nematode damage on corn plants from the same field. Nematode damage is rarely uniform across a field. Photo by J. Bond, Southern Illinois University.

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Legal Statements

ALWAYS READ AND FOLLOW PESTICIDE LABEL DIRECTIONS. Performance may vary , from location to location and from year to year, as local growing, soil and environmental conditions may vary. Growers should evaluate data from multiple locations and years whenever possible and should consider the impacts of these conditions on their growing environment.

The recommendations in this material are based upon trial observations and feedback received from a limited number of growers and growing environments. These recommendations should be considered as one reference point and should not be substituted for the professional opinion of agronomists, entomologists or other relevant experts evaluating specific conditions.

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