



# GRAY LEAF SPOT of CORN

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## Importance

Gray leaf spot of corn, while of little consequence in the US before 1970, has become a major concern to many corn producers in recent years. Serious outbreaks of the disease first occurred in the early to mid 1970s in low-lying areas in the mountainous regions of Kentucky, North Carolina, Tennessee and Virginia. Since this time, the disease has spread to most corn-producing areas of western Kentucky and parts of Delaware, Illinois, Indiana, Iowa, Maryland, Missouri, Ohio, Pennsylvania and west Tennessee.

The recent increase in gray leaf spot's distribution and severity has been attributed to the increased use of no-tillage practices and the more frequent monoculture of corn. Both of these factors favor the survival and increase of the gray leaf spot fungus from one year to the next.

The disease typically develops after tasselling. However, greatest losses occur when the disease occurs before tasselling. Yield reductions can range from 0-50 bu/A, depending on the time of disease onset, disease severity and the corn hybrid's susceptibility and yield potential.

## Symptoms

Early foliar symptoms appear as pinpoint to slightly elongated, roughly parallel-sided lesions with a yellow halo. Halos are best seen by holding an infected leaf up to light. After about 2 weeks these early symptoms become mature, rectangular lesions characteristic of gray leaf spot. Such lesions are tan to gray, 3/4 to 2 1/2 inches long by 1/8 to 1/4 inches wide. They run parallel to leaf veins. Entire leaves may be blighted under heavy disease pressure. Unlike many other corn foliar diseases, gray leaf spot lesions remain evident on completely blighted leaves. Severely affected leaves have a characteristic grayish cast because the lesions produce so many spores of the fungus. Gray

leaf spot develops first on lower leaves and may progress upward to the highest leaf.

Severe blighting of the leaves may also lead to stalk weakening or infectious stalk rot diseases.

## Disease Cycle

Corn is the only crop known to be attacked by the gray leaf spot fungus, *Cercospora zeae-maydis*. The fungus survives the winter in infested corn residue, usually for no more than one year. Survival is favored when the residue is on or above the soil surface. When infested residue is buried during tillage operations, fungus survival is greatly reduced, because it cannot compete successfully with soil microorganisms and because its essential food base is destroyed by the rapid breakdown of the corn leaf residue. For these reasons, the risk of gray leaf spot epidemics is highest in no-till fields where corn is grown without rotation.

In the early summer the fungus within the infested debris produces spores which are wind-blown to the new corn crop. Infections occur during repeated, prolonged periods (11-13 hours or longer) of leaf wetness and high relative humidity (>95%). Moist conditions and daily temperatures of 70-85°F are ideal for gray leaf spot epidemics.

In addition to the environment, gray leaf spot is influenced by plant maturity. Generally,

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initial symptoms do not appear until anthesis, regardless of the planting date. Also, the plant's lower (older) leaves are usually the sites of initial infection. After about 2 weeks, the resulting lesions generate a new crop of spores which infect the middle and upper leaves. As plants mature, susceptibility to gray leaf spot increases. This fact, in addition to the time required for new infections to occur, partly explains the late-season appearance of gray leaf spot in many affected areas of the state.

## Control

*Effective control of gray leaf spot requires using various key cultural practices.*

■ **Crop Rotation**— As previously discussed, the gray leaf spot fungus usually survives in a field for only about one year without a new corn crop. Consequently, a single year out of corn will usually dramatically reduce the level of fungus inoculum and the potential for gray leaf spot-related yield losses.

■ **Hybrid Selection**— Although no corn hybrids are immune to gray leaf spot, you can reduce losses related to the disease by planting hybrids with partial resistance or tolerance. The use of hybrids with some resistance to gray leaf spot is particularly important in a no-till, continuous corn production system. When no-tillage is practiced, infested

corn residue is left on the soil surface. This provides for an earlier, more extensive source of inoculum for gray leaf spot development. In these fields, lesions appear earlier in the season than in fields where some form of tillage is used. The fungus then builds up rapidly, which increases disease severity and the potential for yield reductions. This situation accelerates with each successive year that continuous no-till corn is produced. Information about the disease reactions of many hybrids is available at your County Extension Office.

■ **Silage Production**— When corn is produced no-till for silage one year, the next year's level of disease is not as high as if corn were taken for grain. This is because the actual harvest process removes most of the infested debris from the field. As a result, where silage production is a viable alternative to grain production, the practice may be somewhat effective in managing gray leaf spot in fields with continuous no-till corn.

## Other Considerations—

■ Harvest in a timely manner to help reduce the levels of gray leaf spot-related stalk lodging.

■ Scout your fields regularly to detect gray leaf spot and assess its severity. This practice will help you make crop production decisions for the next crop.

■ Avoid planting susceptible corn in fields prone to frequent and extended periods of dew.

■ Plant hybrids at recommended seeding rates to promote rapid stand establishment and optimal plant development.

■ Plant early if possible. Late planting dates increase the risk of greater gray leaf spot problems due to increased fungal inoculum available at earlier stages of plant maturity.

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