

F i e l d

C r o p

D i s e a s e

F a c t s

Gray leaf spot of corn threatens corn production in many areas of Pennsylvania. The disease was first reported in eastern Cumberland County in 1978, but now can be found readily in most areas of Pennsylvania. Reports of disease outbreaks are most common from low-lying areas and river bottoms, where the duration of high relative humidity and leaf wetness are long enough to favor disease development and spread. Gray leaf spot is strongly associated with fields that contain corn from previous year's crop, and no-till production fields are particularly at risk.

Potential yield losses from gray leaf spot range from 5 to 40 bushels/acre; however, greater losses can occur at high disease levels. Yield losses occur when damage caused by gray leaf spot reduces a corn plant's ability to produce and store carbohydrates in the grain. Stress associated with severe leaf damage can cause premature plant death, reduce silage quality, and predispose plants to stalk rot caused by other fungi.

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Gray Leaf Spot (*Cercospora zeaе-maydis*)

Symptoms

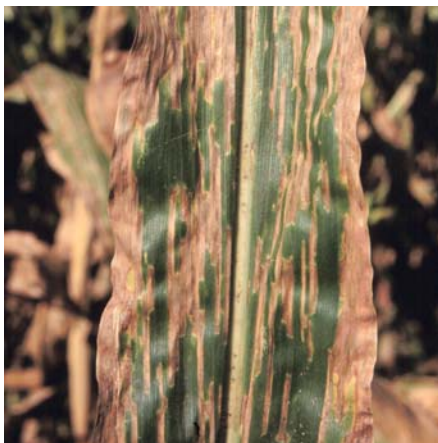
Gray leaf spot is caused by the fungus *Cercospora zeaе-maydis*. Early symptoms of infection include yellow- to tan-colored lesions on leaves. These lesions look very similar to some other leaf diseases, except that they have a faint, watery halo that can be observed when leaves are held up to the light. After about two weeks, the lesions will appear tan to brown in color, and develop a rectangular shape (Figure 1). Gray leaf spot lesions may be 3 to 4 inches long and 1/16 to 1/8 inches wide. Leaf veins restrict pathogen growth and lesion width, but lesion width may vary with distance between veins and proximity to other lesions. Lesions will retain the brown coloration until environmental conditions become favorable

for production of fungal spores, at which time the lesions become silvery-gray. As the season progresses, lesions grow together and the entire leaf may become a gray color (Figure 2).



Figure 1. Corn plants with symptoms of gray leaf spot (a). Note long rectangular shaped lesions (b and c).

Figure 2. Corn leaf with severe gray leaf spot



Disease Cycle

The fungus survives the winter conditions in infested corn debris that remains standing or on the soil surface. In late spring, the fungus will produce spores when temperature and moisture conditions become favorable. Spores produced on the debris are then carried by wind to the lower leaves of the developing corn crop. Generally, the initial infections occur during mid to late June. Infection requires leaf surfaces to be wet for 11 to 13 hours and relative humidity within the canopy to be continuously at or above 90 percent for at least 12 hours. As the lesions develop, the fungus will produce conidia from within the lesion. These spores are moved by wind to the upper leaves of the corn plant, where they cause new infections. This cycle of spore production and infection will continue as long as conditions remain favorable. Severe outbreaks of gray leaf spot are expected when initial infections occur early in the growing season and environmental conditions favor repeated infections of the developing crop. Fields in low-lying areas or river bottoms with high levels of corn debris are at the greatest risk for yield loss to gray leaf spot because of their proximity to the inoculum source and the wet, humid environment. High weed populations may also decrease airflow within the crop, resulting in an increased relative humidity and higher risk of disease. If gray leaf spot occurs late in the season, yield losses may be lower, but extensive blighting can still cause premature plant death and predispose the crop to stalk rot.

Management

1. Resistant varieties

Planting resistant varieties is the most efficient and economical way to reduce crop losses from gray leaf spot. Varieties adapted to areas prone to gray leaf spot are available with adequate levels of resistance to gray leaf spot. These varieties will show some symptoms of the disease in the latter part of the growing season, but losses to disease are greatly reduced. Growers should avoid planting highly susceptible varieties in fields where gray leaf spot has previously been a problem. Information on suitable varieties changes rapidly contact the Penn State Cooperative Extension or seed dealers for the latest information.

2. Crop rotation

Rotating crops is an effective method of gray leaf spot control. Planting a crop other than corn for two years will reduce the amount of initial inoculum to an acceptable level when conservation tillage must be maintained. A one-year crop rotation away from corn and clean plowing should effectively reduce gray leaf spot. Rotation to wheat following corn is not recommended, because *Gibberella zeae*, one of the most common causes of corn stalk rot and ear rot, can also cause head scab on wheat.

3. Residue management

To reduce the impact of gray leaf spot, bury the debris from the previous year's corn crop. This procedure will not totally eliminate the disease, but it will reduce the amount of initial inoculum present in the field. Growers must recognize, of course, that a purpose of no-till is to reduce soil erosion. Tilling the soil by conventional methods will help lower the incidence of gray leaf spot, but may result in greater erosion damage. Many fields in Cumberland and Franklin Counties are not suitable for conventional corn production, so growers must carefully select varieties, particularly for use in fields of continuous corn.

4. Fungicides

Fungicides including Tilt (propiconazole), and Quadris (azoxystrobin), are available to help manage gray leaf spot, but they are only recommended for use on susceptible hybrids planted in fields with a history of gray leaf spot. It is important to apply fungicides early in the season before significant leaf damage has occurred. Thus, scouting fields should be done at the V-10 to V-14 growth stage. Always check labels for appropriate products and application timing. Always carefully consider the economics of chemical and application costs when considering fungicides as a means of disease management.

5. Weed control

A sound weed management program will increase airflow within the crop canopy, reduce relative humidity, and help limit the time periods favorable for infection.

Prepared by Erick De Wolf, Assistant Professor of Plant Pathology

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