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David S. Wysong

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Gray Leaf Spot in Corn

David S. Wysong, Extension Plant Pathologist

Gray leaf spot, caused by the fungus *Cercospora zeaemaydis*, is becoming widespread throughout much of the corn growing region of Nebraska. The development of gray leaf spot is highly dependent upon weather conditions, minimum tillage practices used in corn after corn, and extensive use of susceptible hybrids.

Prior to 1993, gray leaf spot was observed only in an occasional field in south central Nebraska. In the late summer and fall of 1995, the disease could be found throughout much of the state, but infections were confined mostly to lower leaves and, with a few exceptions, had little or no impact on grain yield. The exceptions, however, illustrated its potential; several fields in the Carleton/Davenport/Bruning area that were planted to susceptible hybrids sustained significant yield losses when upper leaves were killed during grain fill. Without exception these were minimum tillage fields with heavy residue remaining on the soil surface from the previous year's corn crop. Prolonged periods of high humidity, night temperatures above 70°F, heavy dews, fogs, and frequent rain showers over the area during 1995 were favorable for the onset and early development of gray leaf spot infections. To some degree, these conditions are promoting its spread and severity across a much wider area in 1996.

The characteristic symptoms of gray leaf spot appear on mature leaves as tan to brown, 1/2 to 1 1/2 inch long, narrow lesions with parallel sides and squared-off ends. The width of the lesion is limited by the small veins of the leaf, hence the parallel sides. Mature individual lesions take on a linear-rectangular appearance. As the number of infections increase, the spots grow together resulting in larger blighted areas. The lesions are tan until dense sporulation under humid conditions produces a grayish cast; hence the common name. Gray leaf spot lesions also may occur on leaf sheaths as relatively large, circular to oblong, tan to brown spots surrounded by a dark brown to purple border. These spots commonly occur just below the sheath-blade juncture. Stalk lesions may occur in heavily infected fields when the fungus spreads from the leaf sheath into the stalk epidermis. Lesions, similar to those on the leaves, also may appear on ear husks.

Infected corn residue on the soil surface is the source of primary inoculum for the next corn crop. The fungus is a poor competitor with other soil microbes. The pathogen survives from one season to the next only if surface debris is present. Spores produced by the fungus in the debris are blown by wind or splashed by rain onto young corn leaves where primary infections occur. The spores require relatively

long periods (several days) of high humidity to successfully germinate, penetrate, and become established in the leaf tissue. Numerous spores are produced two to three weeks later as the lesions mature. These spores cause secondary infections and serve to spread the disease further within and between adjacent plants and fields. Thus, several to many secondary cycles may occur during the growing season if weather conditions are favorable for disease development.

Optimum weather patterns for gray leaf spot development include prolonged periods (two or more days) of continuous high relative humidity (90 percent or more for a minimum of 12 hours), free moisture on leaves from dew, fog, or light rain or irrigation (for a minimum of 12 hours), overcast days, and moderate to high temperatures (75 to 95°F). Temperatures below 70°F during periods of leaf wetness or lack of more than 12 hours of continuous leaf wetness will greatly reduce the rate of gray leaf spot development. The disease might appear to stop during less favorable conditions, but the fungus has the ability to "revitalize" itself when favorable conditions return.

Gray leaf spot can be managed through crop rotation, hybrid selection, tillage practices, and fungicidal applications.

1. **Crop rotation.** Rotating infected fields to non-host crops (i.e., soybeans, small grains, or alfalfa; not sorghum) reduces the inoculum potential within that field. A two-year rotation is preferable for no-till fields. Crop rotation by itself may not be sufficient to prevent disease development in fields surrounded by heavily infected corn fields. Under these conditions, selecting hybrids with moderate gray leaf spot resistance may be advisable.
2. **Hybrid selection.** Most dent corn hybrids have a moderate degree of genetic susceptibility (or resistance or "tolerance", depending upon your point of view) to gray leaf spot, but a few are super susceptible, with a few others being super resistant. Unfortunately some hybrids with a high degree of resistance have lower yield potential (in the absence of gray leaf spot) than do hybrids with lower degrees of resistance. Consult your seed company representatives about the level of resistance or tolerance to gray leaf spot in their hybrids that meet your specific needs.
3. **Tillage practices.** The fungus survives from season to season only in infected debris. When the residues are decomposed, the source of primary inoculum is gone. Buried crop residues break down more quickly than residues left on the soil surface. Leaf tissue on the surface will usually decompose within a year; leaf sheath tissues may remain partially intact into the second year, and stalk tissues may remain for more than two years. Complete burial of infected crop residue will go a long way in reducing the risk of early disease development in a single year. Where clean plowing is not desired because of soil erosion, government programs or other factors, a combination of rotation and hybrid selection is advisable.
4. **Fungicide application.** Several fungicides are registered for use on corn (dent, sweet and pop) but are usually only recommended for use on corn being grown for seed purposes. These include Tilt® and several of the mancozeb products, such as Manzate® 200DF, Dithane® formulations (including DF, F-45, M-45, and WSP), Penncozeb® and Penncozeb® DF. Certain application, harvest, and/or grazing restrictions apply in all cases, so read labels carefully. For instance, Tilt® is not to be applied to field corn being grown for feed or seed purposes after silking, although the mancozeb products may be. The label is the law so follow it carefully.

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