PPFS-AG-C-01

UK COOPERATIVE EXTENSION SERVICE
UNIVERSITY OF KENTUCKY — COLLEGE OF AGRICULTURE

Plant Pathology Fact Sheet

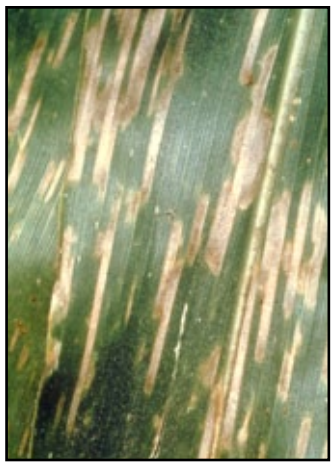
Diseases of Concern in Continuous Corn

Paul Vincelli and Donald E. Hershman
Extension Plant Pathologists

Although most corn in Kentucky is planted following a rotation to other crops, individual producers are often interested in planting corn following corn. In these situations, one of the main concerns voiced by producers is increased pressure from diseases, and rightfully so. Crop rotation is one of the most fundamental disease control practices available. Rotating to other crops deprives *pathogens* (disease-causing microorganisms) of a food source and exposes them to "starvation". Furthermore, as infested crop residues decompose, pathogens are exposed to antagonism by native soil microbes. These mechanisms have the effect of naturally reducing the populations of many pathogens in the soil.

Numerous diseases can be more active under continuous corn, particularly those caused by pathogens that survive in crop residue or in the soil. Three of these are important enough under Kentucky conditions that they deserve specific management attention.

Gray Leaf Spot



This disease is a significant threat wherever corn is grown after corn. The fungus survives between growing seasons in corn leaf blade and sheath residues. From there, it is spread by wind and rain to leaves of the new corn crop. Tillage practices can reduce levels of inoculum (spores or other pathogen structures that initiate disease), but rotation is a key management practice, as well. Thus, in the absence of crop rotation, susceptibility to gray leaf spot should be carefully considered when selecting a hybrid.

Hybrids exhibit differing levels of partial resistance to gray leaf spot. Partial resistance is the most common type of

disease resistance in field crops. Varieties with partial resistance are those that, under uniform conditions, exhibit less disease than some standard cultivar or host line. Gray leaf spot will still develop on a partially resistant hybrid, but it typically is slower to develop and less severe. For example, compared to a fully susceptible hybrid, a hybrid with partial resistance will usually have fewer lesions for a given spore load, and those lesions will be smaller. This reduces the impact of the disease on crop development and yield.

When growing continuous corn, always select hybrids with as high a level of resistance as possible against gray leaf spot. This is particularly important in fields under conservation tillage, in which corn residues provide high amounts of inoculum.

Susceptible hybrids growing in a no-till, continuous corn situation will sometimes benefit from the application of a fungicide. For a susceptible hybrid, a single application at or near the silking stage will often be beneficial, if crop scouting, field disease history, disease favorable production practices, or post-tassel weather forecasts indicate that significant late-season disease pressure may occur. Specialty corns susceptible to gray leaf spot are especially likely to benefit from a fungicide application in a no-till, continuous corn situation, because of their inherently higher crop value.

Field trials show that the fungicides which provide the best control of gray leaf spot are those in the strobilurin (=QoI) family. These include Headline (pyraclostrobin), Quadris (azoxystrobin), or related premixes (Quilt [azoxystrobin + propiconazole] or Stratego [trifloxystrobin + propiconazole]). Products only containing the active ingredient propiconazole are often effective, but do not provide as long a period of protection as the strobilurin fungicides. Although products containing mancozeb (Dithane, for example) are labeled for gray leaf spot, these provide relatively poor control under many commercial conditions. Expect best results from a fungicide when applied using a ground rig fitted with a single nozzle over the row and two drop nozzles straddling each row.

Diplodia Ear Rot

Although most corn fields do not experience notable amounts of this disease, Diplodia ear rot (also referred to as **Stenocarpella Ear Rot**) can occasionally result in severe epidemics, causing rot on as many as 50% to 75% of the ears in a field. The fungus that causes the disease only attacks corn and it survives between seasons in residue of corn stalks, cobs, and fallen kernels. Thus, continuous corn production–especially under conservation tillage–allows the pathogen to build up to potentially destructive levels.

It is a good practice to scout fields for Diplodia ear rot as the crop matures, especially if under conservation tillage. Pull back the husks of 50 to100 plants selected at random as you walk the field. Look for a white, cottony mold growth between the kernels, which usually progresses upwards from the base of the ear. Suspect samples can be confirmed through your County Extension agent. Producers growing no-till corn who find more than 2% to 3% of ears with Diplodia ear rot should consider implementing some management

practice, such as rotation to another crop, tillage, or making sure to select a hybrid with relatively high levels of resistance.

Whenever corn is planted following corn, check with your seed supplier to determine if the seed company specifically breeds hybrids with partial resistance to Diplodia ear rot; some companies do, but not all. Also, avoid hybrids that have experienced serious outbreaks of Diplodia ear rot, since this may indicate unusually high susceptibility to the disease.

Pythium Seedling Diseases

The *Pythium* organism is commonly present in agricultural soils and can cause a variety of symptoms on corn seed and seedlings. Seed decay, pre-emergence damping-off, and post-emergence damping-off are the more striking problems caused by *Pythium*. However, *Pythium* can also infect root hairs and young rootlets, causing reduced vigor of developing plants, which can ultimately affect yields. Studies with a variety of monocot crops, including corn and sorghum, have shown that *Pythium* diseases can significantly reduce stand, vigor, and yield in continuous cropping situations. These studies have shown a significant advantage to using seed treated with the fungicides metalaxyl or mefenoxam, which specifically targets *Pythium*. Metalaxyl is found in Allegiance FL and other products; mefenoxam is found in Apron XL LS and possibly other products. Given the relatively low cost of seed treatment fungicides and the apparent enhanced *Pythium* risk when monocots are cropped without rotation, sowing seed treated with metalaxyl or mefenoxam would make sense where corn follows corn.

Other Diseases

Damaging outbreaks of **northern leaf blight** have occurred several times in Kentucky in the past decade. Although our generally warm summer conditions, as well as sound breeding for resistance, help keep this disease from threatening the Kentucky corn crop as much as gray leaf spot, producers of continuous corn should scout for this disease during grain fill. This way, you'll be able to make a decision about how much resistance the next crop should have. Like the gray leaf spot pathogen, the fungus that causes northern leaf blight survives between growing seasons in corn residue.

Diseases caused by the **anthracnose** fungus, including top dieback (a rot of the upper stalk during grain fill), can be enhanced in continuous corn. Since corn is the only important host of this pathogen, inoculum levels may build up in continuous corn. Attention should be paid to hybrid susceptibility to anthracnose when growing continuous corn. Substantial levels of resistance would be especially important in areas with a history of top-dieback or other anthracnose diseases.

Southern leaf blight generally occurs at low levels in Kentucky because past breeding efforts have led to high levels of resistance in most of the hybrids currently available. Be aware, however, that the risk of this disease is higher under continuous corn because the southern leaf blight fungus survives in corn residue. Thus, it may be wise to at least consider hybrid reaction to this disease when growing continuous corn.

Concern is sometimes expressed that **stalk rots** might be worse in a continuous corn situation. In reality, studies to date indicate that rotation has little to no impact on the severity of stalk rots. Stalk rot incidence is influenced by high plant populations, excessive nitrogen, leaf diseases, and other factors.

Additional Resources

Disease management advice can be found in the following University of Kentucky publications available at County Extension offices, as well as on the Internet.

- A Comprehensive Guide to Corn Management in Kentucky, ID-139
http://www.ca.uky.edu/agc/pubs/id/id139/id139.htm

- Corn Stalk Rots, PPA-26
http://www.ca.uky.edu/agc/pubs/ppa/ppa26/ppa26.htm

- Ear Rot of Corn Caused by *Stenocarpella maydis* (=*Diplodia maydis*), PPA-43 (1997)
http://www.ca.uky.edu/agc/pubs/ppa/ppa43/ppa43.pdf

- Gray Leaf Spot of Corn, PPA-35 (1995)
http://www.ca.uky.edu/agc/pubs/ppa/ppa35/ppa35.pdf

- Kentucky Integrated Crop Management Manual for Field Crops: Corn, IPM-2 (2009)
http://www.uky.edu/Ag/IPM/manuals/ipm2corn.pdf

- Kentucky Plant Disease Management Guide for Corn and Sorghum, PPA-10a (1995)
http://www.ca.uky.edu/agc/pubs/ppa/ppa10a/ppa10a.pdf

(*Revised October 2008*)

Photos: Paul Vincelli, University of Kentucky (Gray Leaf Spot & Diplodia Ear Rot); and Nancy Fisher Gregory, University of Delaware Cooperative Extension (Pythium Seedling Blight)