

Figure 1 • Summary of University and Extension foliar fungicide research trials on corn conducted in 2008 and 2009 in the United States and Ontario, Canada. Results were summarized by Dr. Greg Shaner, Purdue University, and data were provided by University and Extension personnel in Illinois, Indiana, Iowa, Kansas, Kentucky, Maryland, Minnesota, Mississippi, Missouri, Nebraska, North Dakota, Ohio, Ontario, South Dakota, Virginia, and Wisconsin. (Bars represent the average yield difference between an untreated control and Headline, Quilt, or Stratego fungicide applied between the VT and R1 growth stages under different levels of disease pressure).

Which economically-important foliar diseases can be managed with fungicides?

Corn fields in the North Central U.S. and Ontario, Canada are never disease-free, but not all foliar diseases are equal in their potential to reduce yields. In addition, not all foliar diseases can be managed with foliar fungicides. Common rust, for example, often is observed in the North Central U.S. and Ontario; however, its yield-reducing potential generally is low for yellow dent corn hybrids because of their higher levels of resistance. Goss's wilt and Stewart's wilt have the potential to reduce corn yields, but cannot be controlled with a fungicide because they are caused by bacterial pathogens rather than fungal pathogens. A foliar fungicide can be a good tool to help manage gray leaf spot, northern leaf blight, and eyespot. These diseases are considered to be important yield-reducing foliar fungal diseases in the North Central U.S. and Ontario. Southern corn rust, another important foliar disease, can cause yield reductions to corn in the North Central U.S. and Ontario in certain years, but generally is not an annual occurrence.

AUTHOR CONTACT INFORMATION

Dr. Carl A. Bradley
 Department of Crop Sciences
 University of Illinois
 1102 S. Goodwin Ave., Urbana, IL 61801
 Phone: 217.244.7415 • E-mail: carlbrad@illinois.edu

Dr. Paul D. Esker
 Department of Plant Pathology
 University of Wisconsin
 1630 Linden Dr., Madison, WI 53706
 Phone: 608.890.1999 • E-mail: esker@wisc.edu

Dr. Pierce A. Paul
 Department of Plant Pathology
 The Ohio State University / OARDC
 1680 Madison Ave., Wooster, OH 44691
 Phone: 330.263.3842 • E-mail: paul.661@osu.edu

Dr. Alison E. Robertson
 Department of Plant Pathology
 Iowa State University
 351 Bessey Hall, Ames, IA 50010
 Phone: 515.294.6708 • E-mail: alisonr@iastate.edu

ACKNOWLEDGMENTS

Funding for this project was from the United States Department of Agriculture—National Institute of Food and Agriculture (USDA-NIFA; Award no. 2008-34103-19449) for the project entitled, "Development of IPM-based corn fungicide guidelines for the north central states."

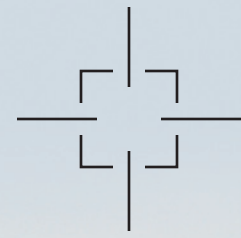
Cover photo by Scott Bretthauer, University of Illinois. Photos of gray leaf spot, northern leaf blight, and southern rust by Carl Bradley, University of Illinois. Photo of eyespot by Alison Robertson, Iowa State University.

FOR MORE INFORMATION CONTACT:

Dr. Alison Robertson
 Department of Plant Pathology
 351 Bessey Hall, Ames, IA 50011-1020
 Tel: 515.294.6708 • E-mail: alisonr@iastate.edu

IOWA STATE UNIVERSITY
 University Extension

Foliar Fungicides for Corn: Targeting Disease



Foliar Fungicides for Disease Control

To spray or not to spray . . . it's not that simple of a decision. A foliar fungicide application might be a good investment to help boost profits, *but not always*. It is important to target diseases when making a foliar fungicide application decision in corn. Spraying corn fields without considering disease risk factors or scouting observations may be like pouring money down the drain. However, in the right situations, foliar fungicides can be used to help protect against yield reductions due to diseases and boost profits. The key to better and more profitable utilization of foliar fungicides in corn is to *target disease* (Fig. 1).

- Carl A. Bradley**
Extension Plant Pathologist, University of Illinois
- Paul D. Esker**
Extension Plant Pathologist, University of Wisconsin
- Pierce A. Paul**
Extension Plant Pathologist, The Ohio State University
- Alison E. Robertson**
Extension Plant Pathologist, Iowa State University



Scouting for foliar diseases

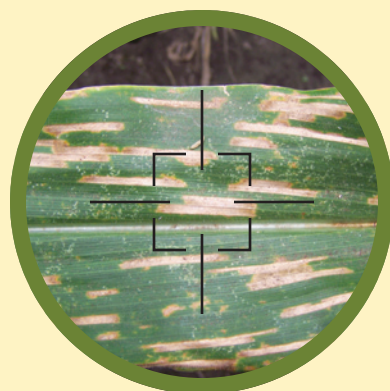
Just prior to tassel emergence, plants should be examined for disease symptoms. Current disease management guidelines suggest that a foliar fungicide application be considered under the following situations*:

- **Susceptible hybrids:** If disease symptoms are present on the third leaf below the ear or higher on 50% of the plants examined.
- **Intermediate hybrids:** If disease symptoms are present on the third leaf below the ear or higher on 50% of the plants examined, **AND** the field is in an area with a history of foliar disease problems, the previous crop was corn, and there is 35% or more surface residue, and the weather is warm and humid through July and August.
- **Resistant hybrids:** Fungicide applications generally are not recommended.

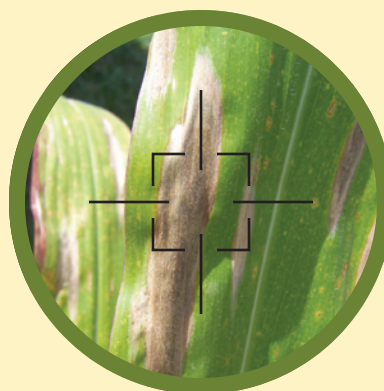
**Note that these guidelines are targeted toward diseases caused by residue-borne pathogens such as gray leaf spot and northern leaf blight, and NOT for diseases caused by air-borne pathogens which have spores that can travel great distances such as common rust and southern rust.*

Putting it all together to make a decision

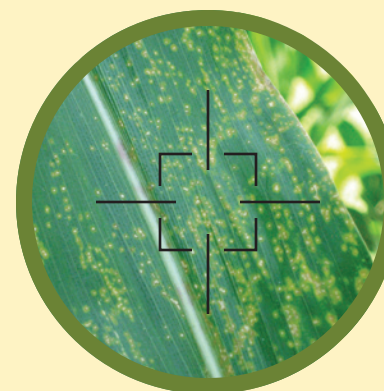
Base your decision to apply a fungicide on the presence of disease risk factors *and* on disease scouting observations. Remember that you are much more likely to increase your profits with a foliar fungicide application if you use the fungicide for disease control purposes. If the decision is made to apply a fungicide, then choose the best product available based on which diseases are present and the level of disease pressure. Check with University and Extension sources or your local agronomist for information on which foliar fungicide products are available for use on corn.



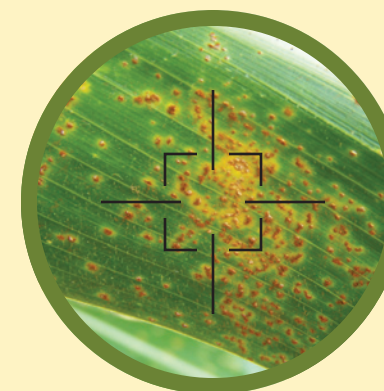
Gray leaf spot



Northern leaf blight



Eyespot



Southern rust

Know the corn foliar disease risk factors

Different factors can increase the risk of foliar diseases appearing in a corn field. These risks are:

1. **Susceptibility level of corn hybrid.** Corn hybrids differ in their susceptibility to foliar diseases. Information about a hybrid's susceptibility to the commonly observed diseases in a particular area should be available from the seed company. In general, hybrids that are more susceptible to fungal foliar diseases will have a greater response to a foliar fungicide (Fig. 2).
2. **Previous crop.** Because many foliar pathogens survive in corn residue, the risk of foliar diseases increases when corn is planted back into a field that was planted to corn the previous year. The more corn residue present on the soil surface, the higher the risk of some foliar diseases.
3. **Weather.** Rainy and/or humid weather is generally the most favorable for foliar disease development. In the absence of rain periods, cloudy days and extended dew periods can increase disease spread and severity. Hot and dry conditions are not favorable for most foliar diseases, and the diseases will be mostly suppressed as long as these conditions persist.
4. **Field history.** Planting corn in a field that has a history of foliar corn diseases can increase the risk of foliar diseases under favorable weather conditions. Field location can affect the risk of foliar diseases; for example, fields located in river bottoms or low areas, or surrounded by trees, may be more prone to having foliar corn diseases.
5. **Southern rust risk.** The risk of southern rust is not strongly affected by the hybrid planted, as most hybrids are susceptible; nor is the risk affected by previous crop, as the pathogen does not survive in crop residue, and as such, must blow up from the southern U.S. to affect corn fields in the North Central U.S. and Ontario. The risk of southern rust can be assessed by accessing the IPM PIPE website (www.ipmpipe.org). This site provides maps of where southern rust has been detected in the U.S. during the growing season.

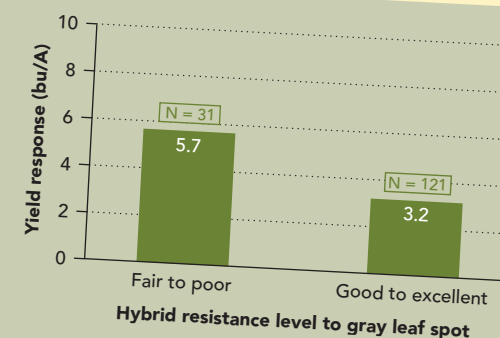


Figure 2 • Summary of University and Extension foliar fungicide research trials conducted in 2007 in the United States and Ontario, Canada on hybrids with Fair to Poor resistance and Good to Excellent resistance to gray leaf spot. Results were summarized by Dr. Carl Bradley, University of Illinois, and data were provided by University and Extension personnel in Illinois, Indiana, Iowa, Kansas, Kentucky, Maryland, Minnesota, Missouri, Nebraska, Ohio, Ontario, and Wisconsin.