



## Do foliar diseases impact corn stalk health?

Disease development in corn around the tasseling stage of growth can result in yield loss, particularly if favorable environmental conditions support continued infection of leaves around and above the ear. Foliar diseases of corn are a concern when they develop early and progress up the plant before grain fill is complete. Warm, humid conditions with free-standing water on leaves promote early infection of corn by northern corn leaf blight (NCLB).<sup>1</sup> Some other diseases to watch for include gray leaf spot (GLS), eyespot, southern rust, tar spot, and Anthracnose leaf blight (Figure 1). There are several fungicides labeled for use in corn that can help manage foliar fungal diseases. Fungicides are not effective on bacterial diseases such as Goss's wilt.

### What is the impact of foliar diseases in corn on overall plant health?

Yield loss can occur when the top 8 to 9 leaves above the ear are infected with disease because these leaves contribute at least 75% of the carbohydrate content of the ear.<sup>2</sup> Disease and other stress factors can reduce the photosynthetic capacity of corn plants during the critical period of grain filling.<sup>3</sup> Decreasing the photosynthetic rate of leaves after tasseling can reduce kernel survival and kernel weight.

In addition, when the photosynthetic capacity of the plant is reduced, kernel demand for photosynthates can increase remobilization of stored carbohydrates from stalk and leaf tissue. Stalks can be weakened by this process, increasing plant susceptibility to stalk and root rots. Multiple stress factors during grain fill can have a substantial impact on corn yield potential.

### What environmental conditions favor foliar disease development in corn?

The most common conditions for foliar disease development in corn are warm and humid or cool and overcast weather with extended periods of dew or free-standing moisture on the leaves and crop residue (which can contain pathogen inoculum) in the field. NCLB infection occurs at temperatures between 66 and 80° F accompanied by extended periods of wetness from frequent rainfall.<sup>4</sup> GLS infection occurs during prolonged warm (75° to 85°F) and humid (more than 90% relative humidity) periods.<sup>5</sup> Symptoms are commonly observed following long periods of heavy dew and overcast days and in bottomlands or fields adjacent to woods where humidity will be higher and dew will persist longer into the morning.

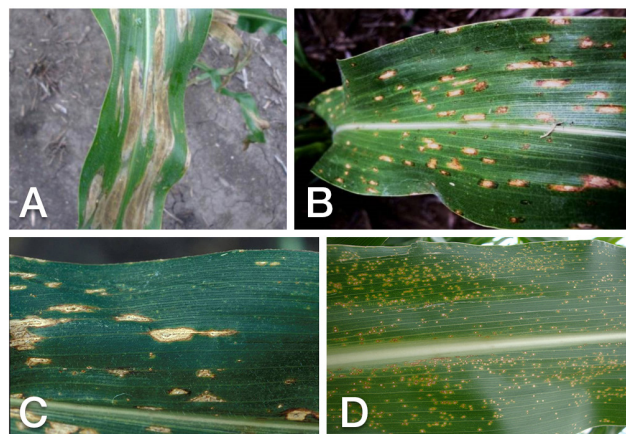


Figure 1. Symptoms of A) northern corn leaf blight (NCLB), B) gray leaf spot (GLS), C) Anthracnose leaf blight, and D) eyespot in corn.

### When should scouting begin for foliar diseases in corn?

Begin scouting fields for foliar disease symptoms just before tasseling and continue through the grain filling stages of growth. Rapid grain filling occurs from R2 (blister) to late R5 (full dent). Examine the ear leaf and leaves above and below the ear at several locations throughout a field. If disease is present on most of the leaves, a fungicide application may be necessary. Thresholds for fungicide use for NCLB do not exist; however, it is especially important to protect the ear leaf and those above it as corn plants enter the reproductive stages of growth. Consider using a fungicide on corn products that are susceptible to NCLB or GLS if disease symptoms are present on the 3rd leaf below the ear or higher on 50% of the plants examined.<sup>6</sup> Fungicide applications can prevent new infections and disease spread, but they will not cure established infections. Identification of foliar diseases can help determine the need for changes in management practices such as tillage, crop rotation, and the selection of more resistant corn products to help reduce the incidence of disease next season.

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## // When should I apply a fungicide to my corn?

In most cases, fungicide applications should be applied at or after tasseling. Fungicides applied from tasseling to brown silk tend to have the best possibility for economic return. Do not use adjuvants if an application will be made prior to the VT (tasseling) stage of growth.<sup>7</sup> Follow all individual product label instructions for proper application timing, application volume, application equipment, and environmental and harvest interval precautions.

## // Should an early-season fungicide application be considered at the V5 to V7 growth stages?

In general, most research has found the greatest yield benefit to fungicide applications at the VT to R1 growth stages. The main challenge with a majority of the yield-limiting foliar diseases is that they do not become problematic until the reproductive stages of development, so it is difficult to determine if an early-season fungicide application is needed. However, the more risk factors at play in a field, the greater the benefit fungicide applications will provide. Before making an early-season application, consider risk factors including continuous corn, no-till, weather conditions, diseases already present during scouting, yield potential, and return on investment. If only one fungicide application can be made, the VT to R1 timing will typically provide the greatest yield benefit and return on investment.<sup>8</sup>

There are many factors to consider when determining if a fungicide application is warranted. Prior to making an application, evaluate each field for the susceptibility of the corn product to the diseases, the current yield potential of each field, disease severity, and corn stage of development. It's important to note that susceptible corn products are more likely to show a favorable response to fungicide applications than corn products with some resistance. The fungicide used should be chosen based on its effectiveness for the specific disease present. Finally, check the weather forecast to evaluate if upcoming conditions will continue to promote disease development.

### Sources:

- <sup>1</sup> Robertson, A. 2014. Northern corn leaf blight prevalent in Iowa. Iowa State University Integrated Crop Management.
- <sup>2</sup> Rees, J.M. 2008. Gray leaf spot of corn. G1902. University of Nebraska.
- <sup>3</sup> Nielsen, R.L. 2013. Stress during grain fill: A harbinger of stalk health problems. Purdue University.
- <sup>4</sup> Wise, K. 2011. Northern corn leaf blight. Purdue University.
- <sup>5</sup> Wise, K. Gray leaf spot. Purdue University.
- <sup>6</sup> Bradley, C.A., Esker, P.D., Paul, P.A., and Robertson, A.E. 2010. Foliar fungicides for corn: targeting disease. University of Illinois, University of Wisconsin, Ohio State University and Iowa State University.
- <sup>7</sup> Stetzel, N., Wise, K., Nielsen, B., and Gerber, C. 2011. Arrested ear development in hybrid corn. Purdue University.
- <sup>8</sup> Wise, K.A., Smith, D., Freije, A., Mueller, D.S., Kandel, Y., Allen, T., et al. 2019. Meta-analysis of yield response of foliar fungicide-treated hybrid corn in United States and Ontario, Canada. PLoS ONE 14(6):e0217510. <https://journals.plos.org>.

Sources Verified 7/8/2019

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