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Northern Corn Leaf Blight

Tamra A. Jackson-Ziems, Extension Plant Pathologist

Northern corn leaf blight is a fungal disease of corn found in most corn-growing regions in the United States that has increased in Nebraska in recent years. This publication provides information about symptoms, high-risk factors, and management of this disease.

Introduction

Northern corn leaf blight (NCLB) is a disease of corn caused by a fungus, *Exserohilum turcicum* (sexual stage *Setosphaeria turcica*). Its development is favored by cool to moderate temperatures and high relative humidity. Historically, NCLB has been more common and severe in states in the eastern Corn Belt, but its incidence has increased in Nebraska and the western Corn Belt in recent years. The disease is distributed throughout most of the corn growing areas of the United States. The disease also occurs sporadically throughout other humid corn producing areas of the world. In Nebraska, the disease has been most serious in the extreme eastern counties, but is becoming increasingly common in central Nebraska during years when weather conditions are favorable for disease development. Yield loss caused by this disease can be extensive, up to 30–50 percent in susceptible hybrids when the disease develops early in the season, prior to tasseling. However, when disease severity is minor or its development is delayed until well after silking, yield impacts are usually minimal.

Symptoms

NCLB can be recognized by the relatively large gray or greenish elliptical or cigar-shaped lesions that can develop on leaves, husks, or leaf sheaths *(Figure 1).* Lesions can range from 1 inch to more than 6 inches long and are oriented parallel to the leaf veins. Some corn hybrids may or may not

Figure 1. Northern corn leaf blight lesions are usually larger, tan to gray, and cigar-shaped.

produce lesions that have dark margins around the edges. They are not restricted by leaf veins and the pathogen does not need a wound to infect the plant. As lesions mature, their color may change to tan and fungal spore production may become visible in the middle of lesions, giving them a darker, dusty appearance *(Figure 2)*. Because the lesions may appear similar to those of other diseases, like Goss's bacterial wilt and blight, it is important to make an accurate diagnosis to effectively manage and minimize losses caused by the disease. The disease commonly develops as a few lesions scattered in the lower canopy, eventually developing lesions in the upper canopy if favorable conditions persist. One or several lesions may form on a leaf *(Figure 3)* and increase in size, often coalescing and blighting larger areas or entire leaves *(Figure 4)*. Symptoms may appear different in seed corn inbred varieties or some resistant hybrids. For example, lesions may appear smaller, more yellow, and/or not produce spores in resistant hybrids.

Epidemiology

The fungus that causes NCLB overwinters in infected leaves, sheaths, and husks from previous years. Spores produced on the residue or on diseased plants in the field can be splashed to new leaves higher on the plants or blown by wind over longer distances to neighboring fields. Spores require 6–18 hours of water on the leaf surface to germinate and infect. The disease is more common during periods of high relative humidity and mild temperatures that favor fungal spore production and germination. Lesion development takes 7–12 days after infection, depending upon the hybrid susceptibility. Thus, disease development may go unnoticed or unrecognized for one to two weeks following favorable weather conditions as lesions develop and may not be recognized until late in the latent phase.

Disease severity increases as lesions expand and grow larger, reducing the photosynthetic area, which reduces grain fill and yield. Disease development early in the season prior to tasseling has a greater potential to impact yield because of the longer period of time and greater leaf area affected reducing photosynthesis and subsequently carbohydrate production.

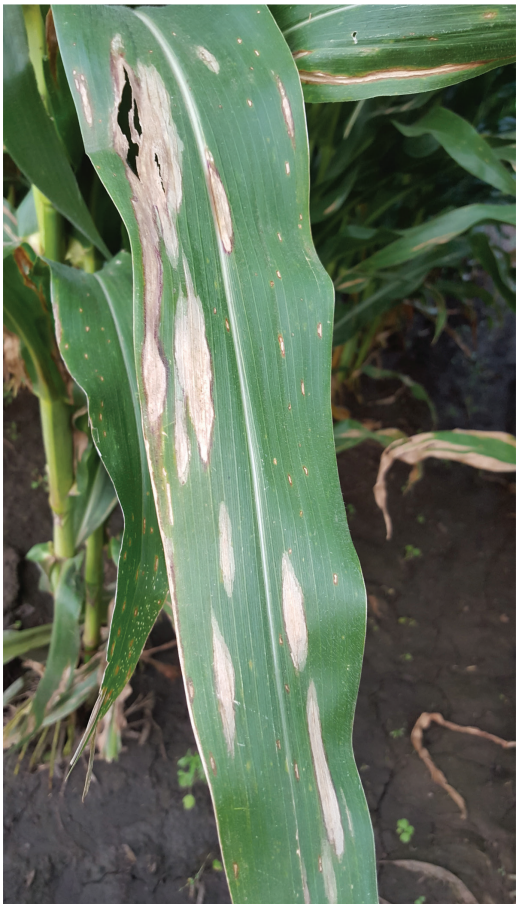
High-risk Factors and Favorable Conditions

Having a history of NCLB in your fields or nearby fields is the most important factor impacting its development. The ability of the fungus to survive from year to year in infected corn residue makes it a perpetual problem once it develops in an area. We do not have a way to eradicate it from a location, so, management of NCLB should be an annual consideration for corn production in affected fields.

Figure 2. The fungus causing northern corn leaf blight can produce large amounts of spores on the surface of lesions, giving them a dark or dusty appearance.

Several corn production practices increase the risk of developing NCLB. Growing susceptible corn hybrids with poor disease ratings for NCLB plays a major role in disease development and its eventual severity. Susceptible hybrids have a greater potential to develop more and larger lesions under favorable weather conditions. Consult your seed company representative or catalog for hybrid disease ratings. Keep in mind that not all companies use the same rating scale; be sure to familiarize yourself with the ratings if comparing across multiple seed company brands.

Prolonged periods of cool, damp weather are favorable for this disease with temperatures of 64–81°F being opti-



Figures 3a and b. Multiple northern corn leaf blight lesions can develop on leaves and expand and become larger, eventually blighting entire leaves.

mal. Cool, wet conditions during spring and early summer are especially favorable for early disease development that can become severe later in the growing season. If weather conditions become warmer or drier, disease progression may be slowed, but the fungus remains viable and can resume activity once conditions become more favorable.

Early season disease development (prior to corn tasseling) is less common, but is a high-risk factor for severe disease later in the season. Disease can also develop rapidly during favorable weather conditions after corn silking.

Because the pathogen survives in the corn debris, cultural practices that maintain more infected residue on the surface are more favorable for this (and other residue-borne) diseases. Reduced tillage systems, while having other benefits, do increase the risk for NCLB. Although tillage practices can promote degradation of infected residue and can reduce disease severity in subsequent years, it will not eliminate the pathogen or risk of disease.

In addition, planting continuous corn is an important risk factor by providing a continuous host and source of the fungus for the following year(s) of corn. Some isolates of this fungus can also infect sorghum and related weedy hosts (Johnsongrass and Sudangrass), but these fungal isolates do not infect corn.

Management

Planting hybrids with good NCLB disease ratings is an economical way to manage the disease. Different types of resistance are available in corn, and variability has been documented in this pathogen, including at least seven races described. Hybrid resistance can help reduce disease severity by limiting the number or size of NCLB lesions that develop, lengthening the incubation period (number of days between infection and lesion development), and/or by reducing the fungal spores produced. Two types of plant resistance can occur in some corn hybrids. Race-specific resistance is from single dominant plant genes called *Ht* genes—short for *Helminthosporium turcicum*, a former name of the fungus causing NCLB. Partial resistance is also available in some hybrids and is effective across multiple races of the fungus. Partial resistance is the result of several plant genes.

Fungicides can be used to slow disease spread and reduce overall severity. However, no fungicide treatment thresholds have been established for NCLB because of the number of factors involved in disease development. The risk for developing yield-limiting disease severity can be assessed by determining the number of high-risk factors that apply to

Figure 4. Severe northern corn leaf blight can cost susceptible plants substantial leaf area in the canopy and impact yield.

a field. Having more of these high-risk factors will increase the likelihood of developing severe NCLB and getting an economical yield response over the cost of a fungicide application. Refer to the most recent version of the Nebraska Extension Guide for Weed Management in Nebraska with Insecticide and Fungicide Information (EC130) for a list of fungicides labeled for use on corn, as well as a table of efficacy ratings.

Cultural practices, such as tillage to bury residue and crop rotation with a non-host crop(s), can also help reduce disease severity by providing time for infected residue to break down between corn crops and reducing the overwintering fungus and risk for NCLB in the future. Although tillage practices can promote degradation of infected residue and can reduce disease severity in subsequent years, such practices will not completely eliminate the risk of disease because some of the pathogen will still survive or could be introduced from neighboring fields or infected residue.

Scout fields early and often to monitor for development of NCLB (and other diseases). Pay close attention during favorable weather conditions to high-risk fields or areas with a history of disease. Considering the hybrid's NCLB disease rating provided by your seed company will help you to anticipate whether the disease may become severe in your fields and if they would be likely to benefit from a fungicide application.

The most effective management of NCLB will likely deploy a combination of strategies to reduce disease risk:

- Plant resistant hybrids
- Rotate with a non-host crop(s) like soybeans, small grains, or alfalfa
- Consider use of tillage to break down infected residue where appropriate in the cropping system
- Application of a foliar fungicide

For more information on northern corn leaf blight, or other diseases, see *http://cropwatch.unl.edu/* and the Crop Watch YouTube channel (*https://youtu.be/5eEjDsLu1DQ*).

This publication has been peer reviewed.

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