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PURDUE EXTENSION

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DISEASES OF CORN

Northern Corn Leaf Blight

Author:
Kiersten Wise

Photos by Kiersten Wise and Greg Shaner

Northern corn leaf blight (NCLB), caused by the fungus *Exserohilum turcicum*, is an increasingly important disease in the U.S. Corn Belt. The disease has appeared annually in Indiana, and has increased in prevalence since the mid- to late 2000s.

NCLB can cause yield loss if it develops before or during the tasseling and silking phases of corn development. Hybrid susceptibility, cropping practices, and weather strongly influence disease development.

This publication describes:

1. How to correctly identify the disease
2. Conditions that favor disease development
3. The impact of the disease
4. How to manage the disease

Identifying the Disease

Early NCLB symptoms appear as long, narrow, tan lesions that form parallel to leaf margins (Figure 1). As these lesions develop, the classic symptoms of NCLB will be observed: long, oblong, or "cigar-shaped" tan or grayish lesions (Figure 2).

The lesions produce olive-green or black fungal spores when humidity is high, which can give the lesions a dark or dirty appearance. The spores are visible if one examines lesions with a hand lens (Figure 3). The lesions range from 1 to 7 inches long, depending on hybrid susceptibility. Multiple lesions may form on a leaf, and lesions can coalesce to form large, irregular areas of dead tissue on the leaves.

Disease symptoms vary by hybrid susceptibility. There are several genetic types (or races) of the *Exserohilum turcicum* fungus. Hybrids with partial resistance to NCLB typically produce fewer and smaller

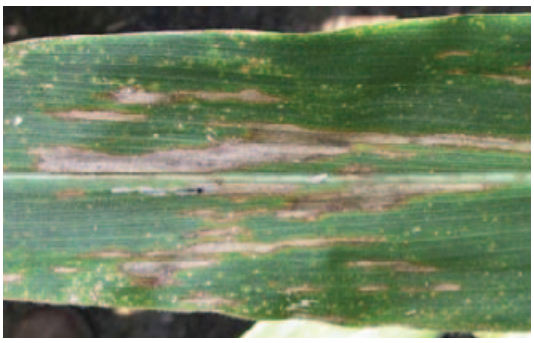

Figure 1. Long, narrow lesions that run parallel to the leaf margin are early symptoms of NCLB.

Figure 2. Oblong lesions develop on leaf tissue after infection by the NCLB fungus, *Exserohilum turcicum*.

Figure 3. Within NCLB lesions, fungal spores form, which can be viewed with a hand lens.

lesions, and fewer fungal spores. On hybrids with race-specific resistance, lesions are small and yellow and produce no spores (Figure 4). NCLB lesions may also appear on the leaf sheaths and husks of susceptible hybrids.

Figure 4. Hybrids with resistance to NCLB will have smaller lesions that may not produce fungal spores.

NCLB symptoms may be confused with symptoms of other foliar fungal diseases such as Diplodia leaf streak, southern corn leaf blight, and Stewart's or Goss's wilt — so an accurate diagnosis is important.

Conditions Favoring Disease Development

The NCLB fungus survives through the winter on infected corn residue at the soil surface. As temperatures rise in the spring and early summer, the fungus produces spores on residue, and then the spores are splashed or wind-blown onto leaves of the new corn crop.

Infection occurs during periods of moderate (64° to 81°F), wet, and humid weather. The fungus requires six to 18 hours of water on the leaf surface to cause infection. Therefore, 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. In Indiana, symptoms are frequently observed late in the growing season, when days become cooler.

In years when summers are cooler and wetter than normal, the disease can develop earlier. Under favorable conditions, lesions can form seven to 12 days after infection. Each lesion can produce many spores, which are splashed or wind-blown to upper leaves or to other plants. Due to the length of the infection process, symptoms may not be noticeable for one or two weeks after infection occurs, depending on weather conditions and hybrid susceptibility. Hot, dry weather restricts disease development and spread.

Disease Impact

NCLB can reduce yield when conditions are favorable for early development of the disease. Lesions reduce the leaf area of the plant that carries out photosynthesis. The more lesions on a plant and the earlier in the season the lesions develop, the greater the loss of photosynthetic area.

If lesions have reached the ear leaf or higher during the two weeks before and after tasseling, yield loss could occur. Hybrid corn yield could be reduced as much as 30 percent if lesions are present prior to or at tasseling. Yield losses in popcorn, sweet corn, or other specialty corn production systems may be greater.

If lesions do not appear on upper leaves until late in the season, yield losses will be less. Unfortunately, there is not a clear relationship between the amount of leaf tissue covered by lesions and the amount of yield loss, so it is not possible to say that a given severity of disease will result in a given loss of yield for any hybrid.

In addition to the potential for yield loss caused by a loss of photosynthetic area, NCLB lesions can contribute to stalk rot development and lodging.

Managing the Disease

Preventative management strategies can reduce economic losses from NCLB. No-till or reduced-till fields planted to susceptible hybrids are at high risk for NCLB development, but weather will be the primary factor for disease development. Preventative management is especially important for fields at high risk for disease development. In-season disease management options, such as fungicides, are also available.

When developing an NCLB management plant, consider the following factors.

Select Resistant Hybrids

Choose a hybrid with moderate resistance to NCLB. Although sporulating lesions will develop on hybrids with moderate resistance, the progress of disease is delayed sufficiently to protect against yield loss.

Hybrids will show different degrees of moderate resistance. Some seed companies indicate the degree of resistance with a numerical rating scale, but pay close attention to these scales — individual companies use different values to indicate the level of resistance. In areas where NCLB is a chronic problem, producers should seek out hybrids with race-specific resistance genes (known as *Ht* genes).

Manage Residue

Production practices that encourage residue to decompose will reduce the amount of fungus present to infect the next corn crop. Continuous corn and no-till or reduced tillage systems are at high risk for disease development due to the amount of residue left on the soil surface.

A one-year rotation away from corn, followed by tillage is recommended to prevent disease development in the subsequent corn crop. In no-till or reduced till fields with a history of NCLB, a two-year rotation out of corn may be needed to reduce the amount of disease in the following corn crop.

Use Fungicides Effectively

Fungicides are available for in-season management of NCLB. However, it is important to remember that fungicide applications are an additional cost to corn production, and economic factors (including corn market prices, fungicide application costs, and disease factors), must be considered when deciding whether or not to apply a fungicide for NCLB management.

Currently, there are no thresholds specifically for NCLB management to aid in fungicide decisions; however, it is important to prevent yield loss by protecting the ear leaf and the leaves above it as the plant enters the reproductive stages.

Scout fields around V14 (or just prior to tassel emergence) to help determine the level of disease pressure in a field. When scouting and weather forecasts indicate that the potential for disease development is high, fungicides that are applied at the tasseling to early silking stages (VT-R1) have the greatest likelihood of economic return. Before deciding to apply fungicides, consider cropping practices, predicted weather conditions, and economic factors.

Fungicides currently available for use on corn can be found in the *Corn and Soybean Field Guide* (Purdue Extension publication ID-179, available from the Purdue Extension Education Store, www.the-education-store.com), or by contacting the Purdue Extension Specialist for Field Crop Diseases.

Fungicides vary in their chemical properties, restricted entry intervals (REI) and pre-harvest intervals (PHI), so it is important to read, understand, and follow all label directions and restrictions before fungicide application.

Reference to products in this publication is not intended to be an endorsement to the exclusion of others that may be similar. Persons using such products assume responsibility for their use in accordance with current directions of the manufacturer.

Find Out More

Find more publications in the *Diseases of Corn* series by visiting the Purdue Extension Education Store
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