DISEASES OF CORN

Goss's Wilt on Grass Hosts

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Photos by Kiersten Wise and Joe Ikley

Goss's bacterial wilt and leaf blight of corn (commonly known as Goss's wilt) is caused by the bacterium *Clavibacter michiganensis* subsp. *nebraskensis* (Cmn). The disease was confirmed in Indiana in 2008 and is an annual problem in field corn, popcorn, and sweet corn.

The bacterium that causes the disease overwinters on host debris and infects susceptible hosts when rain or irrigation water splash bacteria on to host tissue. Hosts for Goss's wilt include corn, sorghum, and several common grass weeds including shattercane and foxtail species (yellow, giant, green, and bristly).

Recent Purdue University research has found that several additional grasses are also hosts for this bacterium. These include the weedy grasses large crabgrass and johnsongrass, and the common cover crop annual ryegrass.

Notably, our research did not find that any of the broadleaf weed species we tested were hosts for this bacterium. The common cover crop cereal rye was also not determined to be a host. Barnyardgrass was previously reported as a host for the bacterium, but was not confirmed as such in our research.

This publication describes:

- How to identify Goss's wilt on various grass hosts
- Revised disease management recommendations given the newly discovered host range

Diseases of Corn: Goss's Bacterial Wilt and Leaf Blight (Purdue Extension publication BP-81-W, available from the Education Store, www.edustore.purdue.edu) describes the symptoms and conditions that favor disease development on corn. In general, disease symptoms on corn include large, water-soaked lesions that appear toward the leaf margins and include characteristic brown-black freckles (Figure 1).

Symptoms of Goss's wilt in other grass hosts also include the characteristic freckles. However, these grass hosts also develop host-specific symptoms that are important for correct identification of the disease. The sections below identify the major characteristics of Goss's wilt in the newly confirmed grass hosts.

Figure 1. (A) This photo shows the characteristic freckling symptoms of Goss's wilt on a corn leaf. (B) This photo shows a close up of Goss's wilt freckles on corn.

Annual Ryegrass *(Lolium multiflorum)*

On annual ryegrass, Goss's wilt symptoms are expressed as red-brown necrotic lesions. When an infection becomes severe, dark brown freckles appear along the leaf veins, preceding the advancing lesion (Figure 2).

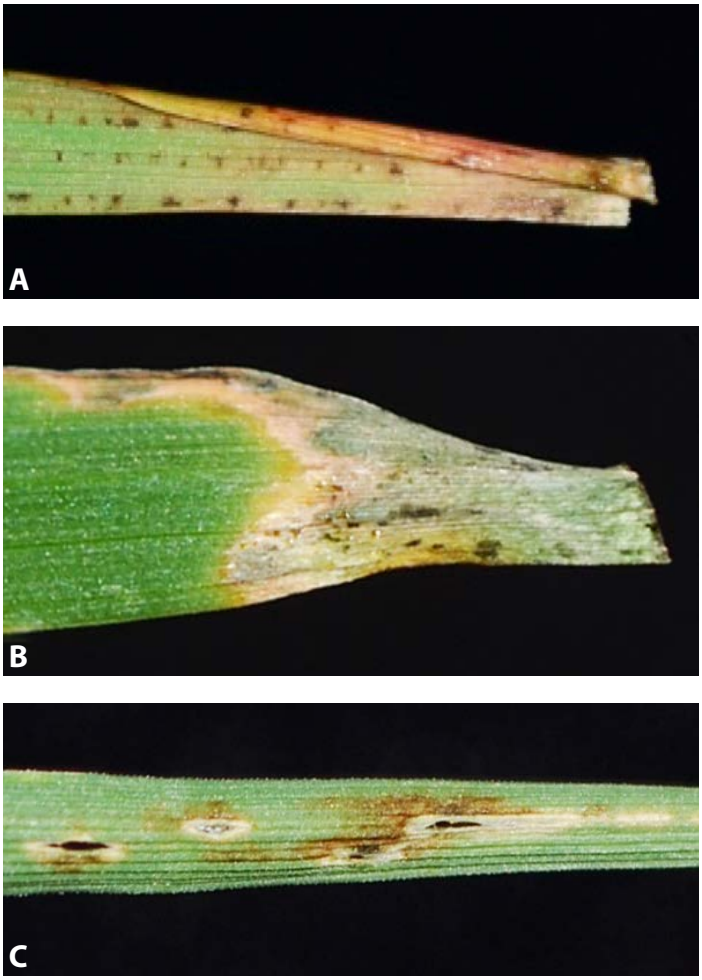

Figure 2. These photos show various symptoms of Goss's wilt on annual ryegrass:
(A) red-brown necrotic lesions,
(B) tan necrosis preceding the advancing lesion, and
(C) dark brown freckles along the leaf vein.

Large Crabgrass *(Digitaria sanguinalis)*

Large crabgrass infected with the Goss's wilt bacterium exhibits dark green freckles. These freckles are typically embedded in a water-soaked lesion. Unlike the lesions on giant foxtail (see below), the lesions on large crabgrass are crimson-red, or simply appear light green (Figure 3).

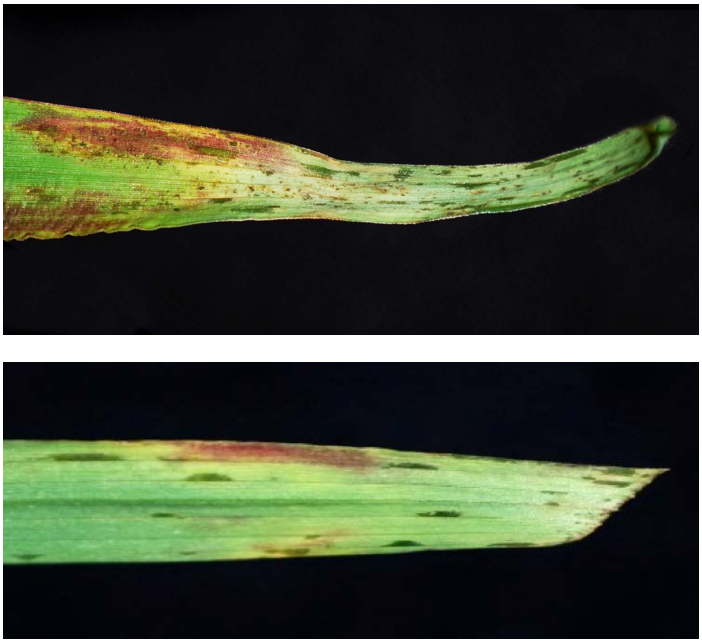

Figure 3. These photos show the symptoms characteristic of Goss's wilt on large crabgrass: dark green freckles embedded in water-soaked lesions.

Giant Foxtail *(Setaria faberi)*

Giant foxtail leaves infected with the Goss's wilt bacterium appear water-soaked and brown. Typically, there are dark brown freckles on the edge of, or within, the leaf (Figure 4).

All other susceptible foxtail species (yellow, green, and bristly) produce similar symptoms.

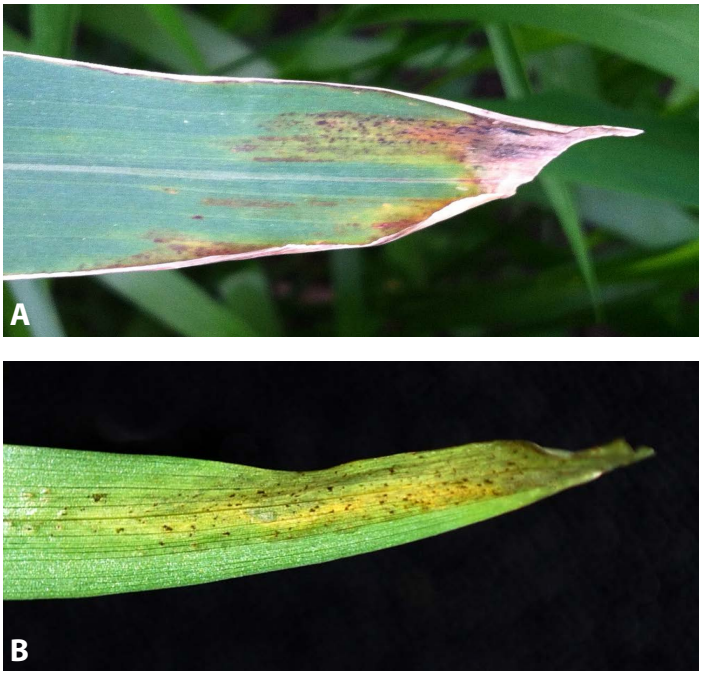

Figure 4. These photos show symptoms of Goss's wilt on giant foxtail:
(A) dark brown freckles that precede an advancing lesion, and
(B) freckles within water-soaked leaf tissue.

Johnsongrass *(Sorghum halepense)*

Johnsongrass leaves that have Goss's wilt display dark green to brown freckles. Occasionally, these freckles are red and tend to be present within the lesion. Red lesions can often be seen on infected johnsongrass leaves, and the lesions remain small and confined (Figure 5). Goss's wilt symptoms on johnsongrass are similar to those on shattercane.

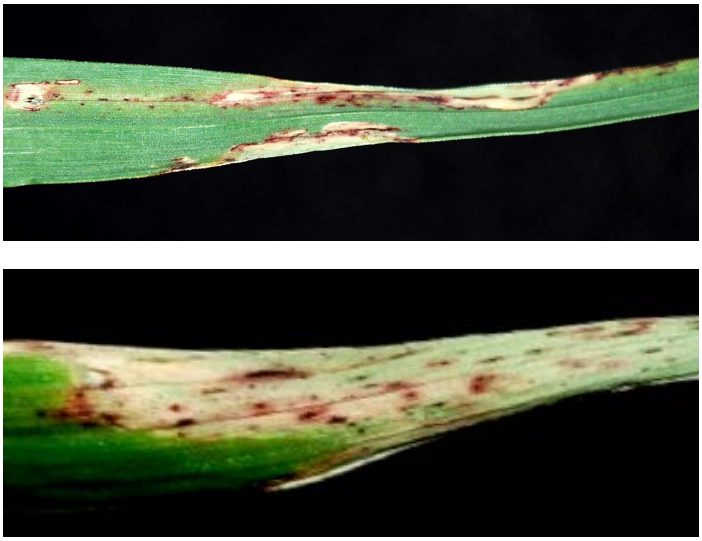

Figure 5. These photos show the red-brown freckles within leaf lesions that are characteristic of Goss's wilt in johnsongrass.

Management

Diseases of Corn: Goss's Bacterial Wilt and Leaf Blight outlines general management recommendations for this disease. These guidelines include selecting hybrids with resistance to the disease and using practices that promote residue decomposition (such as tillage and crop rotation).

Weed management is another important tool for managing Goss's wilt. If the susceptible weeds described above are present in your field season after season, they provide a home for bacteria and can be a source to infect corn.

Sound weed management practices include:

- Using pre-emergence herbicides to help ensure that weeds do not emerge and become infected. There are many grass control herbicides for corn and soybeans.
- Applying post-emergence herbicides to help reduce the amount of host debris. Since the bacterium that causes Goss's wilt survives on the dead tissue of previously infected weeds, timely post-emergence treatments (when weeds are small), is necessary to reduce the amount of debris in fields.
- Avoid planting annual ryegrass as a cover crop in fields with a history of Goss's wilt. Instead, consider non-host cover crops such as cereal rye.

Goss's wilt is often difficult to diagnose on corn, and is more difficult to diagnose on weedy and cover crop species. If you are unsure of the diagnosis, it is important to send samples to a plant diagnostic lab to determine the cause of the symptoms before making management decisions.

The Purdue Plant and Pest Diagnostic Laboratory provides information about submitting samples at ppdl.purdue.edu.

Reference

Joseph T. Ikley, Kiersten A. Wise, and William G. Johnson (2015) Annual Ryegrass, Johnsongrass, and Large Crabgrass are Alternative Hosts for *Clavibacter michiganensis* subsp. *nebraskensis*, Causal Agent of Goss's Wilt of Corn. Weed Science: doi: 10.1614/WS-D-15-00028.1.

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