

agronomy

JANUARY 2019

SOUTH DAKOTA STATE UNIVERSITY® GRONOMY, HORTICULTURE & PLANT SCIENCE DEPARTMENT

Bacterial Leaf Streak of Corn: A New Corn Disease in South Dakota

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Bacterial leaf streak, caused by *Xanthomonas vasicola pv. vasculorum* (Xvv), is a recently discovered disease of corn in South Dakota. The disease was first identified in Nebraska in 2016 but now has been found in the majority of the Corn Belt states. Under favorable weather conditions bacterial leaf streak can develop to reach yield reducing levels. Like any other bacterial disease, once symptoms develop there is little that can be done to control it in the field. However, it is important to correctly diagnose this as a bacterial disease because it can be confused with gray leaf spot which is a fungal disease.

Identifying the disease

Bacterial leaf streak lesions start as narrow yellow, tan, brown or orange streaks between the leaf veins (Figure 1). Initial lesions develop usually near the midrib but occasionally can develop anywhere on the leaf blade (Figure 2). As the symptoms progress, lesions may elongate and coalesce (Figures 2, 3).

Advanced symptoms are characterized by long, tangray lesions with wavy margins surrounded by a dark brown reddish, water soaked halo (Figure 3). The most distinctive symptom used to distinguish bacterial leaf streak from gray leaf spot, is the wavy margins of the lesion caused by bacterial leaf streak (Figure 4). Gray leaf spot lesions have regular, rectangular margins restricted by the leaf veins. Another characteristic of bacterial leaf streak is the length of the lesions, which can range from less than an inch to several inches long. Gray leaf spot lesions typically are only a few centimeters long (Figure 4).

When bacterial leaf streak lesions are held against the light, transparent chlorotic margins (Figure 5) can



Figure 1. A corn leaf with initial bacterial leaf streak symptoms (Photo credit: Emmanuel Byamukama)



Figure 2. Intermediate symptoms of bacterial leaf streak (Photo credit: Emmanuel Byamukama)

be seen, whereas gray leaf spot lesions do not have transparent margins. Bacterial leaf streak symptoms can be seen on corn as early as the V7 growth stage and symptoms often first appear on lower leaves but can also develop on upper leaves later in the growing season.

The causal agent and life cycle

Bacterial leaf streak is caused by the bacterial pathogen *Xanthomonas vasicola pv. vasculorum* (Xvv). Infection is favored by rainy weather especially where high winds, hail and sand blasting occur. It is thought that the bacteria population on the leaf surface must reach a certain threshold before initiating disease as is common with bacteria in this same classification. This being a relatively new pathogen, very little research has been done to determine the survival and spread of this bacterium. The bacterial leaf streak pathogen (Xvv) is thought to survive on infested corn residues. The pathogen may also survive on seed, but transmission through seed is still under investigation. Xvv has also been confirmed infecting a few grasses, namely bluestem and bristly foxtail.

Risk factors for bacterial leaf streak development

This disease has been found on volunteer corn in a field which had previously been diagnosed with bacterial leaf streak on corn, indicating this bacteria can survive on corn residue. Research done in Nebraska indicates irrigated corn and corn on corn fields have a high probability of being found with bacterial leaf streak. Weather also plays a big role in the development of bacterial leaf streak. Wind and



Figure 3. Advanced symptoms of bacterial leaf streak (Photo credit: Emmanuel Byamukama).



Figure 4. Bacterial leaf streak lesions (left) contrasted with gray leaf spot lesions (right). Note the wavy margins with a dark brown halo. The gray leaf spot lesions are relatively shorter and restricted within the veins of the leaf (Photo credit: Emmanuel Byamukama).



Figure 5. A corn leaf with bacterial leaf streak symptoms, when held against light, reveal the transparent lesions and the wavy margins which are characteristic of this bacterial disease (Photo credit: Emmanuel Byamukama).

heavy rains accompanied by hail may increase the risk of this disease. Susceptibility of the hybrid planted may also play a role but screening for hybrid resistance or tolerance has not yet been done.

Management of bacterial leaf streak

When making management decisions, it is important to verify the diagnosis. Gray leaf spot and bacterial leaf streak can look similar and the fungicides used to treat gray leaf spot are not expected to have an effect on bacterial leaf streak. It is thought that corn residue can be a source of inoculum. Therefore, using standard practices to help promote crop debris degradation such as tillage where practical and crop rotation may help to reduce inoculum levels. Because very little is known about this disease, management practices are still being evaluated. Although no information is available on hybrid resistance to this disease, susceptibility may vary.

Other useful references

- Robertson, A., et al. 2016. Bacterial leaf streak of corn. Crop Protection Network. Online <u>https://</u> <u>cropprotectionnetwork.org/download/2550/</u>
- Jackson-Ziems, T., Adesemoye, T., Van Meter, J. 2016. Bacterial leaf streak of corn confirmed in Nebraska, other corn belt states. CropWatch online <u>https://</u> <u>cropwatch.unl.edu/2016/bacterial-leaf-streak-cornconfirmed-nebraska</u>

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