



Pest e-alerts



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Bacterial Leaf Streak - New Corn Disease Found in Oklahoma

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Following reports of a new bacterial disease of corn caused by *Xanthomonas vasicola* in nearby states, I surveyed corn fields in Caddo, Garvin, Kingfisher, and Texas Counties of Oklahoma for symptoms of bacterial leaf streak in August 2016. The survey was confined to irrigated fields that still had green leaves as it was late in the corn-growing season and many fields in other parts of the state were mature and drying down. Symptoms consisting of elongated necrotic lesions with irregular margins often surrounded by orange to yellow colored borders were observed in several fields in Texas Co., although disease severity was low (less than 5%) (Fig. 1). The disease was initially identified by observing bacterial streaming from diseased leaf sections under the microscope (Fig. 2). The bacterium was positively identified with PCR primers specific for *X. vasicola*, and its pathogenicity to corn was verified on 21-day old plants grown in the greenhouse. Bacterial suspensions were used to spray-inoculate plants in humidity chambers in the greenhouse, or were spot-inoculated into leaves of plants left on the greenhouse bench. Typical bacterial leaf streak lesions developed within 7 days and were generally more severe on spray-inoculated plants (Fig. 3) compared to spot-inoculated plants (Fig. 4). The disease was present in Oklahoma last year (2 of 19 fields were positive), but it was only a minor problem. Other diseases were of minor concern except in Texas Co. where the fungal diseases, southern rust and gray leaf spot (Fig. 5), were present and generally more severe than bacterial leaf streak.



Figure 1: Symptoms of bacterial leaf streak of corn in Texas Co., OK.

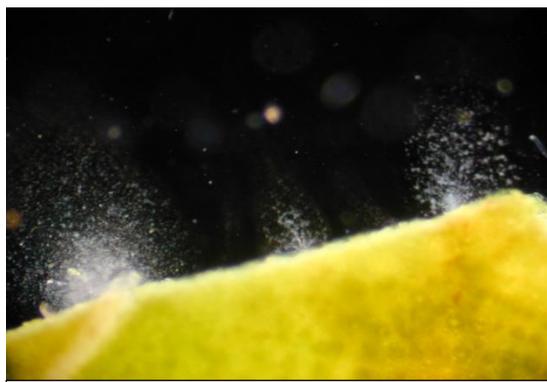


Figure 1: Symptoms of bacterial leaf streak of corn in Texas Co., OK.



Figure 3: Symptoms of bacterial leaf streak on greenhouse-grown corn spot inoculated with *Xanthomonas vasicola*.



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Figure 5: Gray leaf spot (bottom leaf), southern rust (middle leaf) and both gray leaf spot and southern rust on corn leaves in Texas Co., OK.

The presence of this disease in U.S. corn was not announced until 2016, but bacterial leaf streak was first observed in corn in 2014 in a few isolated fields in Nebraska. In 2015, it was widespread in Nebraska and was observed in Colorado. In 2016 it had spread into Kansas and other corn belt states. Because this is a new disease of corn in the U.S. and bacterial diseases caused by *Xanthomonas* species are typically seedborne, USDA/APHIS regulated information exchange on this disease to protect U.S. corn trade interests until it was determined that the disease was not a threat to corn production and would not impact corn end uses (https://www.aphis.usda.gov/aphis/newsroom/news/SA_By_Date/newsroom-2016/SA-08/statement-corn-xvvy).

The bacterium likely survives in infested corn residue and may be introduced into new fields through contaminated seed although seed transmission has not been verified. The disease has been most severe in irrigated, continuous corn fields that use no-till or minimum till production systems. In corn-growing areas where the disease has been most severe (NE, KS, CO), the disease first appears during vegetative stages of crop development when corn is typically free of foliar diseases (Fig. 6). Unlike Goss's wilt, another bacterial disease of corn which requires wounding for infection, *X. vasicola* can invade non-wounded leaves, presumably through natural leaf openings (stomata) during warm rainy weather when wind-driven mists occur, which are favorable for rapid spread of bacterial disease. Elongated lesions can develop that are confined within leaf veins and yet have wavy or irregular borders (Fig. 7). Differences in lesion length and appearance may be due to environmental conditions, differences in hybrid susceptibility, or leaf age at the time of infection. It can be difficult to distinguish bacterial leaf streak from other diseases such as gray leaf spot, which also produces elongated leaf spots confined by leaf veins. The main distinguishing feature of gray leaf spot is the straight edge of the spot (Fig. 5) in contrast to uneven lesion edges of bacterial leaf streak. However, when lesion length is restricted, it can be difficult to distinguish bacterial leaf streak young gray leaf spots. Bacterial leaf streak is not thought to severely affect yield because affected fields have produced high yields. However, in at least one county in Kansas, lower than normal yields in 2016 were associated with severe bacterial leaf streak.

Management strategies for bacterial leaf streak have not been well developed, but rather based on *Xanthomonas* diseases of other crops. Crop rotation with non-hosts should limit disease development. The pathogen does not affect grain sorghum or other crops typically grown in rotation with corn. Bacteria survive best on surface residue, but tillage is not recommended at this time because of its adverse effects on soil conservation. In the long term, it is likely that development of resistant hybrids will be the primary method of control. Because the disease is bacterial, fungicide application will not be effective against bacterial leaf streak. Be sure to rule out bacterial leaf streak when the need for fungicide application is being considered. Samples can be submitted to the OSU Plant Diseases and Insect Diagnostic Laboratory for disease identification in corn.



Figure 6: Early symptoms of bacterial leaf streak on vegetative corn in NE (photo courtesy Larry Appell).



Figure 7: Elongated lesions of bacterial leaf streak with wavy borders and yellow margins (photo courtesy of Alison Robertson, Iowa State University).

Plant Disease and Insect Diagnostic Laboratory

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