

BACTERIAL WILT

Xanthomonas campestris



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Bacterial wilt is a disease on the rise in annual bluegrass (*Poa annua*) putting greens. Bacterial wilt also attacks some older, vegetative creeping bentgrass cultivars, but is seldom a problem in seeded cultivars. The disease also may be found on higher cut collars and approaches.

Bacterial wilt primarily has been observed in the Mid-Atlantic and Northeastern regions of the U.S. Although it often appears in May, it may persist throughout the summer. This disease is favored by periods of heavy rainfall followed by cool nights, and warm and sunny days. The disease may subside during sunny and dry weather, but rapidly redevelops following rain.

In situations where the disease is chronically severe, greens composed primarily of annual bluegrass may have to be renovated. Bacterial wilt is caused by *Xanthomonas campestris*, and is the only known bacterial disease of turfgrasses in the United States.

SYMPTOMS

Bacterial wilt tends to be more severe on shaded and/or poorly drained greens. Bacteria have no means of penetrating cells, so they must enter plants through natural openings such as stomates and hydathodes, or through wounds. Inside plants, replicating bacterial cells plug vascular tissues.

Once the xylem elements of a large number of roots or shoots become plugged with masses of bacterial cells, plants begin to wilt. This blockage prevents the upward movement of water and nutrients and plants die primarily due to lack of sufficient water.

Initial symptoms therefore appear as wilt and individual infected annual bluegrass plants quickly turn reddish-brown or yellow, and die in whitish-tan spots about the size of a dime (Figure 1).



Figure 1. Infected plants die in dime-sized spots, and often leave pits or depressions in the surface of putting greens.

KEY POINTS

Bacterial wilt is mainly a disease of annual bluegrass. Although it often appears in May, the disease may persist through summer.

Infected plants die in tan-colored spots about the size of a dime.

Bacteria plug the vascular tissues of plants and prevent upward movement of water and nutrients.

Low mowing heights and injurious cultural practices often intensify the disease.

Short-term control may be provided by products which contain copper hydroxide.

Collapsed tissue in dead spots often form depressions or pitting and disrupt the playability of the putting surface. When many spots coalesce, large areas can be destroyed in a non-uniform pattern within a few days. When there is coalescence of numerous dead plants, the non-uniform browning can mimic anthracnose (*Colletotrichum graminicola*).

Another symptom of bacterial wilt sometimes can be seen in annual bluegrass located along the perimeter of infected putting greens. These areas generally are mown less frequently (i.e., clean-up cut) and individual leaves of infected plants may become unusually elongated (Figure 2).



Figure 2. Elongated leaves in unmown areas may be an indicator of bacterial wilt.

DIAGNOSIS

Bacterial wilt is extremely difficult to diagnose and the pathogen cannot be seen without the aid of a microscope. As noted previously, the disease can easily be confused with anthracnose. And, it is not uncommon to find bacterial wilt on greens with a history of anthracnose. It also is possible for annual bluegrass plants to be affected by both diseases. Annual bluegrass displaying the aforementioned symptoms should be sent to a turf pathologist for positive disease identification.

In the laboratory, a diagnostician will section the leaves (usually a yellow central shoot) and roots of suspicious plants with a razor and look for oozes or streaming of bacterial cells on a microscope slide (Figure 3). Slow oozes from yellow or senescent tissues are common, but rapid streaming of cells from vascular bundles of mostly green leaves or roots is the best indicator of bacterial wilt.

MANAGEMENT

The increased incidence of the disease may be due to the trend for very low mowing heights and higher frequency of topdressing and similar cultural practices, which tend to wound plants. Increasing mowing height and reducing mowing frequency reduces disease severity, but also slows the speed and therefore playability of putting greens. Avoid mowing excessively wet greens. Mowing turf when leaves are dry may slow the spread of the disease.

Should the disease be restricted to one or a few greens, a “dedicated mower” should be used. It is best to use a light-weight, walk-behind greens mower. The dedicated mower should be washed with a 10% Clorox® solution or similar disinfectant after use, and the mower should not be used on disease-free greens.

Topdressing should be avoided when the disease is active. This is because sand abrades and wounds tissue, creating ideal entry points for the bacteria. Similarly, it is important to avoid core aeration, vertical cutting and other abrasive practices as long as the disease is active.

Products containing copper hydroxide (Junction®, Kocide®, others) may provide good, short-term control. Anecdotal observations suggest that rates from 0.5 to 2.0 ounces per 1,000 ft² are relatively safe. Do not tank mix copper hydroxide with other products unless otherwise stated on the label. Apply copper hydroxide on a 5 to 7 day interval during active disease periods.

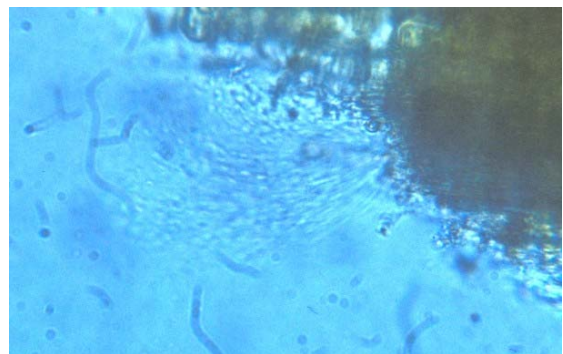


Figure 3. Bacteria streaming from an infected leaf.

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