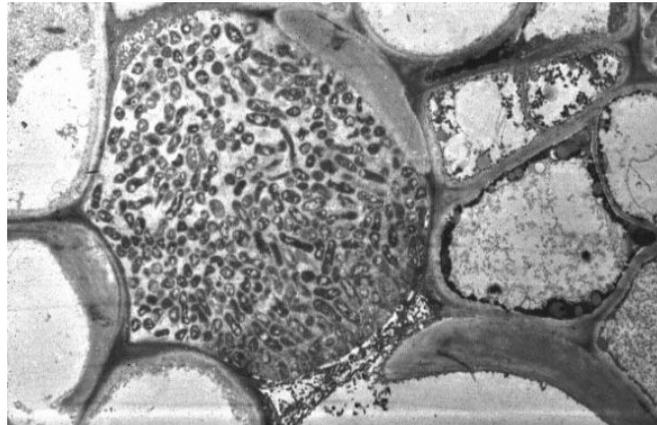




## Bacterial Leaf Scorch of Shade Trees

Bacterial leaf scorch (BLS) is an infectious chronic disease caused by the fastidious, gram-negative, xylem-limited bacterium *Xylella fastidiosa*. This bacterium, which is transmitted by xylem-feeding insects, colonizes and physically "clogs" the tree's water conducting tissues or xylem. Water transport becomes disrupted in roots, branches, and leaves due to large amounts of multiplying bacteria and their by-products. The presence of the bacteria also triggers a reaction in the tree that plugs the xylem, further impeding water transport and eventually killing the tree.

Bacterial leaf spreads systemically and causes slow decline and death of a tree. BLS is not new but is appearing more frequently in landscape trees in various parts of the country. It has been found in coastal US states from New York to Texas, in Washington, DC, as well as in California, Indiana, Kentucky, Nebraska and Ohio. This may simply be because more people recognize the symptoms.



Trees infected with *Xylella fastidiosa* exhibit marginal leaf necrosis, or browning, bordered by a pale halo band separating the dead or scorched tissue from the green tissue. Leaf discoloration begins at the leaf margin and moves toward the midrib. Symptoms recur each year and spread over the tree's crown, thus, reduction in growth and dieback are common in affected trees.

Several leafhopper species have been identified as vectors of this bacterium. However, vectors vary in their efficiencies in acquiring and transmitting the different strains of *X. fastidiosa*. Vector efficiency may be related to some extent to host affinities or feeding habits.

Insects are able to acquire and transmit the bacterium during the immature and adult stages of their development. Immature insects retain their ability to transmit until they molt. This is because insects shed the foregut during molting and this is the site from which the bacteria are introduced by the feeding vector into the plant. After molting, the insect has to feed from an infected plant to acquire the bacterium again. Fewer than 100 bacteria in the vector can transmit the disease. Acquisition and inoculation of bacteria can be accomplished very quickly, thus, no latent period is required.

There is no effective preventative treatment or cure for bacterial leaf scorch, so one should expect diseased trees to be gradually lost over the years. The eventual best remedy for bacterial leaf scorch is tree replacement.

However, in the meantime, infected trees can be made to look somewhat presentable for a few more years if the dead wood is pruned out. Careful scouting combined with judicious pruning can help to rid the tree of symptomatic branches especially since there are no chemicals registered for treatment.

- Leafhoppers, which spread the disease, are active most of the growing season making it impractical to control this disease by insecticidal treatments. Transmission of this disease is so unpredictable that efforts to prevent it by preventing vector feeding are likely to be futile.
- Trunk injections with antibiotics have been shown to suppress symptoms. Treatments must be made annually in late May or early June. The antibiotic oxytetracycline has been tested as a treatment, but it only caused the remission of symptoms; it did not provide a cure.
- Pruning has been another possible treatment; however with only limited success in delay of scorch development. Pruning has been devoted to public safety in trees that have shown some natural resistance to the disease.
- Mulching and irrigating during periods of little rainfall will reduce moisture stress and possibly delay scorch development.
- The effects of fertilization are still unclear with this disease. Fertilizing should be performed when a soil or leaf analysis shows a nutrient deficiency.
- Removing trees has been necessary to maintain safety and is considered when trees no longer add to the landscape.



*Information obtained from the US National Arboretum*



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