

Bacterial Leaf Scorch



Figure 1. Bacterial leaf scorch on winged elm (*Ulmus alata*). Note the yellow halo separating the scorched tissue from the green tissue.

Bacterial leaf scorch is a disease of shade trees, ornamental plants, and economically important food crops such as peaches, pecans, blueberries, and citrus. The disease is caused by *Xylella fastidiosa*, a bacterium that gets its name because it is limited within the plant to the water-conducting tissue (xylem) and because it has very specific nutritional needs (fastidious), making it very difficult to grow outside the plant.

Symptoms of bacterial leaf scorch look a bit like drought stress. When the water-conducting tissue of the plant becomes clogged with bacteria, not enough water reaches the leaves. The edges of leaves become brown or “scorched,” and often there is an area of yellow leaf tissue between the scorched leaf edge and the healthy green leaf tissue near the center of the leaf (Figure 1). Leaves fall from the plant well before normal fall leaf drop. Usually, leaf symptoms first appear in late spring and early summer. Hot, dry weather increases the severity of symptoms.

Laboratory testing is the only way to confirm that a plant has bacterial leaf scorch, but there are some clues to help tell the difference between drought stress and the disease in the landscape. For plants infected with *Xylella*, the pattern of browning at the edge of the leaf is usually irregular. Scorch symptoms begin on the oldest leaves on the branch; young leaves at the tips of branches may

remain green. In the case of drought stress, the edge of each leaf will be evenly brown, and symptoms will appear first on the leaves at the tips of branches (the youngest leaves). Bacterial leaf scorch also may only affect one branch or a part of the plant, whereas drought stress will affect the entire plant.

In addition to ornamental plants, bacterial leaf scorch also affects rabbiteye and southern highbush blueberry varieties and pecans. The twigs and stems of young infected blueberry plants may look yellow, a symptom that is most noticeable after the scorched leaves have fallen. Infected pecans show typical leaf scorch symptoms and will not produce as many nuts. The pecan kernels that are produced will be smaller than normal. Other important diseases caused by *Xylella fastidiosa* include Pierce’s disease of grapes, citrus variegated chlorosis, phony peach disease, and plum leaf scald. A partial list of susceptible plants is provided in Table 1.

Table 1. Currently recognized strains of *Xylella fastidiosa* and a partial list of the plants they infect.

<i>Xylella fastidiosa</i> strains	Hosts
<i>X.f.</i> subsp. <i>fastidiosa</i>	Grapevine (Pierce’s disease of grapes)
<i>X.f.</i> subsp. <i>fastidiosa</i>	Almond
<i>X.f.</i> subsp. <i>fastidiosa</i>	Maple
<i>X.f.</i> subsp. <i>multiplex</i>	Blueberry
<i>X.f.</i> subsp. <i>multiplex</i>	Crape myrtle
<i>X.f.</i> subsp. <i>multiplex</i>	Elm
<i>X.f.</i> subsp. <i>multiplex</i>	Ginkgo
<i>X.f.</i> subsp. <i>multiplex</i>	Oak
<i>X.f.</i> subsp. <i>multiplex</i>	Peach (phony peach disease)
<i>X.f.</i> subsp. <i>multiplex</i>	Pecan
<i>X.f.</i> subsp. <i>multiplex</i>	Plum (plum leaf scald)
<i>X.f.</i> subsp. <i>multiplex</i>	Sweetgum
<i>X.f.</i> subsp. <i>multiplex</i>	Sycamore
<i>X.f.</i> subsp. <i>morus</i>	Mulberry
<i>X.f.</i> subsp. <i>pauca</i>	Citrus (citrus variegated chlorosis)
<i>X.f.</i> subsp. <i>sandyi</i>	Daylily
<i>X.f.</i> subsp. <i>sandyi</i>	Magnolia
<i>X.f.</i> subsp. <i>sandyi</i>	Oleander

Xylella fastidiosa is made up of several strains that are classified as subspecies (Table 1). The strains are specific to certain plant hosts and do not infect other plant hosts. For example, the strain that causes Pierce’s disease of grapes does not cause leaf scorch disease in oaks. Table 1 provides a list of some of the plants associated with each strain. Many types of herbaceous and woody plants, such as bermudagrass, English ivy, flowering dogwood, American beautyberry, and goldenrod are infected by the bacteria but are immune to the disease and never show symptoms. Such plants are called alternative hosts, and they can serve as an invisible source of bacteria in the landscape.

Xylella fastidiosa is spread by sap-sucking insects (leaf hoppers and spittlebugs). In pecans, the disease can also be spread by grafting scions cut from infected trees. In blueberries, the disease can spread when cuttings are propagated from infected plants. Infected plants may not show symptoms until another stress, such as drought, insect infestation, or disease makes the plant more vulnerable. Bacterial leaf scorch is a chronic disease. An infected plant can never be cured of leaf scorch, but, if treated properly, it may live for years after infection.

Management

Shade trees	<p>Prune out dead limbs or remove infected trees from the landscape if they pose a hazard. Removing infected trees does not seem to make a difference in preventing spread of the disease in the landscape, so if the tree is not a hazard, it can be left in place and cared for by limiting stress, as outlined below.</p> <p>Reduce water stress by watering during drought and using mulch around the tree. Mulch should not be deeper than 3 inches. Alleviate soil compaction and avoid digging or paving in the root zone of the tree. Fertilize with nitrogen only if soil test recommendations indicate a need to do so. Manage other pests and diseases.</p> <p>Plant a variety of different tree species.</p> <p>Oxytetracycline is available to commercial applicators and can be used as a therapeutic (not curative) treatment for mildly affected, high-value landscape trees. Mycoject Ultra is labeled for use only on elm, oak, oleander, sweet gum, and sycamore trees. Oxytetracycline does not cure infections but can reduce symptoms if applied 2–3 times a year and if water stress is minimized.</p>
Blueberries	<p>Remove and destroy infected plants. Do not make cuttings from infected plants. The southern highbush varieties ‘Emerald,’ ‘Southern Belle,’ and ‘Windsor’ and rabbiteye varieties ‘Powderblue’ and ‘Premier’ have shown some resistance in field and laboratory trials.</p>
Pecans	<p>Promote tree vigor by watering during droughts and controlling insect and cultural stresses. Fertilize according to soil testing or tissue analysis recommendations. Remove dead limbs and hazardous trees.</p> <p>Ideally, scions should not be taken from infected trees. However, submerging infected scion wood in a 46°C water bath for 30 minutes and then immediately submerging the scions in room temperature (22°C) water for 1 minute has been demonstrated to be very effective in producing successful disease-free grafts.* To avoid damaging the scion wood, do not allow the temperature of the water bath to go above 52°C.</p> <p>Commercial pecan producers should consult MSU Extension Publication 3005 Pecan Bacterial Leaf Scorch for more detailed information.</p>

*Sanderlin, R. S., & Melanson, R. A. (2008). Reduction of *Xylella fastidiosa* transmission through pecan scion wood by hot-water treatment. *Plant Disease*, 92,1124-1126.

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