

SYCAMORE LEAF SCORCH

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Fastidious xylem-limited bacteria (FXLB, i.e., bacteria which are nutritionally demanding and incapable of growth on conventional bacteriological media) are associated with leaf scorch and/or leaf scald symptoms in a number of broadleaved tree species including almond (*Prunus amygdalus* Batsch) (7), Japanese plum (*Prunus salicina* Lindl.) (6), American elm (*Ulmus americana* L.), sycamore (*Platanus* spp.), and red oaks (*Quercus* spp.) (4). Although Koch's postulates for proof of pathogenicity have not been specifically fulfilled for each host-bacterium association, current evidence implicates these organisms (formerly referred to as rickettsia-like bacteria; RLB) as causal agents of these and perhaps other vascular wilt-like diseases (2,5). In 1983, Sherald *et al.* (8) provided convincing evidence that FXLB were a primary causal agent of sycamore leaf scorch, symptoms of which had been previously reported from many locations within the natural range of the species (3). In September 1984, sycamores (*P. occidentalis* L.) exhibiting leaf scorch symptoms were identified in a residential development near Tallahassee. Isolations from symptomatic material performed by Dr. D. L. Hopkins confirmed the presence of FXLB (apparently the first confirmation of these organisms in sycamore in Florida). The distribution and impact of sycamore leaf scorch in Florida is unknown. However, the destructive potential of this disease makes sycamore leaf scorch worthy of attention.



Fig. 1. Symptoms of sycamore leaf scorch on *Platanus occidentalis*. A) Crown exhibiting typical and severe symptoms. Note how symptoms characteristically develop from bottom of tree upward and inside of crown outward. B) Branch exhibiting "scorched" and curled older leaves with healthy, green, younger leaves at its tip. (Photo credit: David Romano, Leon County Forester)

DISEASE BIOLOGY AND SYMPTOM DEVELOPMENT. Xylem-limited bacteria are vectored by various stylet-bearing, xylem-feeding insects such as sharpshooter leafhoppers (Homoptera: Cicadellidae: Cicadellinae) and spittlebugs or frog hoppers (Homoptera: Cercopidae). Once introduced into susceptible host tissues (i.e., vessels, tracheids) the pathogen proliferates and is distributed within the vascular system. Distribution is presumably passive, aided by the flow of xylem sap, since no evidence of bacterial motility has been observed. As infection progresses, infected tracheary elements become increasingly occluded with bacteria as well as associated gums and tyloses (2,5). Although the complete mechanism of pathogenesis is unknown, and some have postulated the involvement of a bacterial toxin (7), the physical plugging of tracheary elements is thought to be a prime contributor (5).

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Leaf scorch symptoms in sycamore typically develop in mid to late summer (4,8). Symptoms begin as an olive-green discoloration of marginal and interveinal tissues. These tissues soon appear "scorched" and affected leaves turn brown and curl or cup while remaining attached to their supporting branches. Older leaves scorch first, and it is not uncommon for terminal leaves on the current year's growth to remain scorch-free. Leaf scorch may affect individual branches, large portions of tree crowns, or entire tree crowns (Fig. 1). Trees with extensive leaf scorch may exhibit an orange (1) or "butterscotch" (author - unpublished observation) discoloration of the inner bark. Where leaf scorch is severe it is common to find cankers caused by one or more stress-related canker fungi (1,3).

CONTROL. Although effective controls for sycamore leaf scorch have not been developed or tested, the following practical strategies are worthy of consideration. 1) Minimize moisture stress(es) to ornamental and plantation sycamores by planting trees on appropriate sites (i.e., sites with a good supply of groundwater). 2) Maintain insect vector populations at low levels, using appropriately registered insecticides where warranted as part of an integrated control program. 3) Avoid unnecessary mechanical injuries to trees which might compound unavoidable environmental stresses.

Hopkins (5) discussed some interesting possibilities for control of Pierce's disease of grape (also caused by xylem-limited bacteria) using tetracycline antibiotics. These materials may possess limited utility for controlling sycamore leaf scorch in high value ornamentals, but definitive studies and legal pesticide registration are lacking.

SURVEY AND DETECTION. Look for sycamores with leaves exhibiting a brown "scorched" appearance. Scorch symptoms will typically be on leaf margins and interveinal tissues, and leaves will curl or cup. Scorched tissues are usually dry and crisp. Young, terminal leaves are often unaffected.

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