

Sooty canker, a devastating disease of Indian laurel-leaf fig trees

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THE INDIAN OR CUBAN LAUREL-leaf fig (*Ficus nitida* [synonyms *F. retusa* var. *nitida*, *F. microcarpa*, *F. microcarpa* var. *nitida*]) is a common, conspicuous, and easily recognized tree in urban landscapes throughout coastal California. It also is used in the warmer portions of California's Central Valley, the low deserts of California, Arizona, and southern Nevada, and in Hawaii. It finds use in parks and other large, open spaces but is, perhaps, most familiar as a street tree, and many cities in California, including Los Angeles, Long Beach, Santa Monica, Lakewood, Beverly Hills, Whittier, Riverside, and Claremont, among many others, have rather imposing, signature plantings lining boulevards and avenues (Fig. 1).

Smooth, white bark, robust trunks, conspicuous, muscular, upward sweeping and spreading scaffold branches, and dense, heavy, globular crowns of lustrous green

leaves characterize Indian laurel-leaf figs (Fig 2.). Unfortunately, many trees in street plantings are given inadequate root and crown space, and as a result have grown too large for the allotted space, are frequently and severely root and shoot pruned, and have caused extensive, recurring hardscape damage, earning the tree a not-so-friendly reputation. The trees take somewhat easily to this severe shearing and can be pruned into giant

hedges or find use in topiary, where they are sometimes imaginatively sculpted into bizarre shapes resembling lollipops, beer cans, and footballs. However, when well grown and given sufficient space, Indian laurel-leaf figs can make exceptionally handsome specimens, imparting grandeur of shape, texture, habit, and uniformity to street plantings.

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In recent years sooty canker, a fungal disease characterized by branch die back and tree death, has ravaged street plantings of Indian laurel-leaf figs in southern California.

Figure 1. (Left) The Indian laurel-leaf fig finds use in parks and other large, open spaces but is, perhaps, most familiar as a street tree. (Donald R. Hodel)

Figure 2. (Right) Smooth, white bark, robust trunks, conspicuous, muscular, upward sweeping and spreading scaffold branches, and dense, heavy, globular crowns of lustrous, dark green leaves characterize the Indian laurel-leaf fig. (Donald R. Hodel)





Figure 3. (Left) Sooty canker seems particularly devastating on Indian laurel-leaf figs, perhaps because it damages and kills these trees in conspicuous swaths of otherwise uniform street plantings. (Donald R. Hodel)

Figure 4. (Right) The first symptoms of sooty canker on Indian laurel-leaf fig are typically restricted to a specific branch on the tree, and include lack of normal spring growth flush (left and center arrows), smaller, subtly discolored leaves, and crown thinning (right arrow). (Donald R. Hodel)

branch die back and tree death, has ravaged street plantings of Indian laurel-leaf figs in southern California. Although sooty canker occurs on a wide variety of plants, including agricultural tree crops and such popular and common landscape trees as *Acacia*, *Arbutus*, *Betula*, *Citrus*, *Eucalyptus*, *Fraxinus*, *Juglans*, *Magnolia*, *Morus*, *Platanus*, *Populus*, *Pinus*, and *Prunus*, to name just a few, it seems particularly devastating on Indian laurel-leaf figs, perhaps because it damages and kills these trees in conspicuous swaths of otherwise uniform street plantings (**Fig 3**). The disease has caused severe damage and death to Indian laurel-leaf figs in many cities, including Santa Monica, Long Beach, Lakewood, Beverly Hills, and Whittier.

Unfortunately, we know little about sooty canker on Indian laurel-leaf figs, and the information here is gleaned from the sparse literature referenced below, which mostly addresses this disease on other species of trees, and our personal experiences with this disease on laurel-leaf figs in southern California.

Pathogen: The fungus *Natrassia mangiferae* (synonym *Hendersonula toruloidea*) causes sooty canker. This same pathogen also causes a skin disease on humans; indeed, an on-line

search of the pathogen turns up more references relating to the human skin disease than to the plant disease.

Disease description and diagnosis: The pathogen enters the tree primarily through bark wounds resulting from pruning or other mechanical damage, freezing weather, sunburn, insects, or other diseases. Smooth, thin-barked trees, such as the Indian laurel-leaf fig, and/or those stressed from improper culture, such as insufficient water, are especially susceptible to sooty canker. Wind, rain, pruning tools, and insects, birds, and other animals can spread the fungal spores. Infections can occur year round but the fungus grows best and disease develops and advances most rapidly in warm temperatures (85 to 105 F) and/or high humidity. Mild, moist winters and warm to hot summers promote infection and disease development. While coastal southern California is not extremely hot, humidity is typically high, perhaps explaining why the disease is not a serious concern in more arid inland communities like Claremont and Riverside. Strangely, until recently sooty canker was most problematic in the hot but more arid low deserts of Arizona and Nevada, where mulberry (*Morus alba*) was especially hard hit. Why it attacks some species in more arid areas but not others that it does

attack in more humid areas is not well understood.

Sooty canker on Indian laurel-leaf fig seems to have appeared suddenly in coastal California. Why after many years seemingly healthy trees are now succumbing to the disease is a mystery. But the answer may lie in the fact that most of the infected trees are in the 40-to-60-year-old range, perhaps putting them near the end of their natural life, at least under the exacting and taxing conditions of an urban street tree. Old trees, especially under urban street tree conditions are more easily stressed, making them susceptible to pests, abiotic disorders, and diseases, like sooty canker.

The first symptoms of sooty canker on Indian laurel-leaf fig are typically restricted to a specific branch on the tree, and include smaller, subtly discolored leaves, loss of vigor, crown thinning, and reduced or lack of normal spring growth flushes (**Fig. 4**). New growth that does occur may not color up properly. As the disease progresses, twigs die back and leaves die, and, while many dead leaves fall, some persist and hang on the dead twigs. Eventually, the entire branch will die, resulting in a crown composed of distinct green and brown patches, sometimes in rather dramatic fashion (**Figs. 5-6**). If dis-



Figure 5. (Left) As sooty canker progresses, the entire branch will die, resulting in a patchy looking crown of green and brown. (Donald R. Hodel)



Figure 6. (Right) Sometimes the patchy nature of the crown is conspicuous and dramatic. (Donald R. Hodel)



Figure 7. (Upper left) If disease progression slows, the tree will sometimes resprout with new growth below the damaged branches.



Figure 8. (Upper right) If sooty canker progresses to the main trunk, which is usually the case, the tree will die. (Donald R. Hodel)

Figure 10. (Lower left) Black, pencil-point-size fungal fruiting bodies typically occur on the cankers (arrows) (Donald R. Hodel).



Figure 11. (Lower right) Infected sapwood inside the bark is stained gray to black and sharply demarcated from adjacent, light-colored healthy wood in longitudinal section. (Donald R. Hodel)

ease progression slows, the tree will sometimes resprout with new growth below the damaged branches (Fig. 7). If the disease progresses to the main trunk, which is usually the case, the tree will die (Figs. 8).

Infected branches have slightly sunken cankers but these are difficult to see and not always readily visible (Fig. 9). Black, pencil-point-size fungal fruiting bodies typically occur on the cankers but, like the cankers, are difficult to see and often overlooked (Fig. 10). Moistening the bark with water removes dust and aids in seeing the cankers and fruiting bodies. Infected sapwood inside the bark is stained gray to black and sharply demarcated from adjacent, light-colored healthy wood (Figs. 11-12). In advanced, old infections, bark cracking, splitting, and peeling may occur. Disease progression is typically moderately fast, and the entire process from initial infection to death can take from one to three years or even longer (Figs 13-14). Hot, dry, windy conditions may accelerate disease development. Disease development and advancement on a street planting of Indian laurel-leaf figs is often spectacular, and is frequently characterized by a string of seemingly healthy, vibrant trees with dark green leaves slashed with four or five, obviously distressed or dead trees.



Figure 9. Branches infected with sooty canker have slightly sunken cankers.

Symptoms on Indian laurel-leaf fig differ somewhat from those reported on other trees in the desert Southwest, where traditional wilt symptoms are readily apparent and are perhaps the result of the exceedingly hot and dry weather, which exacerbates water tension in the tree. Indian laurel-leaf figs do not typically exhibit traditional wilt symptoms in cooler and more humid coastal California, or they usually have masses of

black spores (from which the name of this disease is derived) under the bark of infected branches, as is the case with most species of trees infected with this disease in the desert Southwest.

Management and control: Appropriate culture to prevent tree stress and avoidance of bark wounds offer the best control (Fig. 15). Irrigate and fertilize properly. Avoid over irrigation and over fertilization. Ensure that drainage is good. Avoid practices that wound bark. Sound bark is the first line of defense.

Avoid unnecessary, elective, and/or severe pruning, especially of large branches, not only because of the resulting wounds but also because such pruning opens up the interior of the canopy to direct sunlight that can then burn previously shaded bark. If pruning is necessary, do it in the winter months to reduce the chances of sunburn, and preferably during cool, dry periods when the pathogen may be less active. To help prevent sunburn after pruning, consider painting the tops of newly exposed branches with a non-oil-based, white, latex paint.

If detected sufficiently early, it may be possible to prune out initial infections that are confined to one or a few branches. Cut at least one foot below infected wood, using

Figure 12. (Left) Infected sapwood inside the bark is stained gray to black and sharply demarcated from adjacent, light-colored healthy wood in transverse section (Donald R. Hodel).

Figure 13. (Right) Sooty canker typically progresses moderately fast. Photo of this tree was taken in June, 2008. Compare with same tree in Fig. 14, six months later (Donald R. Hodel).





Figure 14. (Left) Same tree as in Fig. 13 but six months later in December 2008 (Donald R. Hodel).

Figure 15. (Right) Appropriate culture to prevent tree stress is critical to controlling sooty canker. Tree on right displays healthy, vibrant, vigorous growth. Compare to tree on left that is likely stressed and displays reduced vigor, making it more susceptible to sooty canker (Donald R. Hodel).

proper pruning techniques. Limited field observations suggest that as the infection progresses down a branch it is stopped or slowed at the junction with a larger branch or the trunk. Thus, to slow the spread of the disease, it is important to employ proper pruning techniques and not to damage or otherwise compromise the branch collar and branch bark ridge. When pruning out infected branches or pruning any infected trees, disinfect pruning equipment and saws between cuts and before moving to a new tree with a 4:1 water to household bleach solution. Do not use chain saws because they cannot be adequately cleaned and do not paint the wound with pruning compounds. Consider applying a copper fungicide, such as Bordeaux mixture, to the cut. Because copper fungicides are typically water soluble, it may be necessary to reapply them after rain or if sprinkler water is striking the

painted cut. If necessary, redirect sprinklers away from the tree.

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This article is the first in an occasional series looking at diseases of specific landscape trees.

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75

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