University of California Cooperative Extension – Kern County

NEWS RELEASE

1031 S. Mt. Vernon Avenue • Bakersfield, CA 93307 • 661-868-6200 • http://cekern.ucdavis.edu

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John Karlik, Farm Advisor
Environmental Horticulture/Environmental Science
(661) 868-6220

Browning of Redwood Trees in Kern County

Coast redwood trees, *Sequoia sempervirens*, have been extensively planted in the Bakersfield area in residential landscapes, streetscapes, and parks. A number of these trees now have reddish to brown foliage which may include portions of branches, entire branches, or in some cases almost the entire tree. Brown foliage is primarily the result of the lack of general adaptation of this species to the climate and soil found in the southern San Joaquin Valley, rather than to attack a specific disease organism or insect. Consequently, treatment options are limited.

Coast redwood trees are native to California and are found in cool mountain settings, such as the Santa Cruz area, along US 101 in Mendocino County, and at higher elevations of the Sierra Nevada mountains. In these locations daytime summer temperatures tend to be about 20-30^{o} F lower than found in Bakersfield, the relative humidity is higher, and the soils in such forested areas can be expected to have a pH of approximately 6.0 — 6.5, at least one full pH unit below the 7.5 or above often found in Bakersfield landscapes. These factors — temperature, humidity, and soil pH — are fundamental determinants of plant growth, and limit the natural range of plant species. Considering the locations of native stands of coast redwoods, the generally fair-to-good performance of this species in Bakersfield is remarkable.

Within any plant species characteristics of individuals vary, and in a large population the adaptation of individuals may follow the pattern of a bell curve. In other words, a few plants may grow very well with excellent color and longevity, most of the plants perform adequately, and a few plants grow poorly. For plant species which are not well adapted, the curve shifts since the number of individuals struggling with the environment increases. Relatively greater numbers of coast redwoods show symptoms of poor growth as compared to well-adapted species. Coast redwoods have been extensively planted over the past ten years, and the sheer number of plants also ensures that more problem specimens will be observed in landscapes.

It has been suggested that a foliar disease or diseases are responsible for the brown needles found on coast redwoods in the Bakersfield area. However, most foliar diseases are favored by cool and wet conditions around leaves which are necessary for germination of fungal spores, and these conditions are hardly typical of non-winter months in Bakersfield. For example, Cercospora blight, caused by fungi in the genus *Cercospora*, can cause browning of leaves of coast redwoods. However, the disease usually attacks lower branches and spreads outward, not the typical pattern seen in redwoods in Bakersfield, and is favored by wet weather including splashing rain and moderate temperatures. Another pathogen, *Botryosphaeria dothidea*, can produce dieback of affected limbs; however, coast redwood is not listed as a susceptible host. Also, this disease attacks plants weakened by drought, freezing, or other injury, and is generally unable to infect healthy tissue, and thus the fundamental problem is the predisposing weakness of the plant. Even if these diseases were present, I know of no studies suggesting treatment with fungicides would be effective. Sudden oak death, caused by *Phytopthora ramorum*, has not been found in redwoods in Kern County, and even where present in coastal California this disease does not cause redwoods to discolor in the manner observed around Bakersfield.

What can be done? Adding a little extra nitrogen as fertilizer may encourage new growth in the spring and mask the brown needles. (It is normal for inner older needles to turn brown after several years and be replaced by new growth.) Landscape plantings with brown redwoods almost invariably appear to receive sufficient irrigation, but increasing irrigation may help. Although some cultivars have been said to possess greater adaptation to Valley conditions, specimens from all cultivars appear to be affected.

In summary, coast redwood has now become a widely planted tree species in the southern San Joaquin Valley despite its lack of adaptation, and some fraction of those plants can be expected to be discolored or exhibit dieback despite normal cultural practices in the landscape. Landscape managers and homeowners should consider the possibility of discolored foliage when purchasing coast redwoods, especially if large numbers of these trees are to be planted. ■