University of California Cooperative Extension

THE GREEN SCENE

Kern County • 1031 S. Mt. Vernon Avenue • Bakersfield, CA 93307 • Telephone 661-868-6220

August 2005

Proper Mowing: A Key for Turfgrass Quality

Mowing is one of the most common cultural practices applied to turfgrass, and is beneficial for turf appearance and health when done correctly. Infrequent mowing or improper cutting height will reduce turf quality and can contribute to environmental stress or disease in the turf. Based on observation, improper cutting heights – usually too low rather than too high – are frequently causes of poor turf growth in the Bakersfield area.

Proper mowing results in several benefits, the most obvious a smoothing of the surface of the turf. Regular mowing increases shoot density and can result in a higher number of turf plants per square foot. Mowing also stimulates increased shoot growth; leaves will become narrower and shoot tissues will be more succulent if turf is mowed regularly. However, as cutting height is reduced, turf becomes more susceptible to stress such as heat and drought. If cutting height is decreased past the lower limits for the turf, shoot growth and density will be reduced, roots will become shorter and the turf will become thin. Bermudagrass cut low enough to resemble a golf green usually develops bare spots coupled with weed invasion.

Each turfgrass species has an optimum mowing height. In general, warm season grasses (those which go dormant in winter) can be cut lower than cool season turfs (those which are green year-around). The ranges of cutting heights (inches) are as follows: common bermudagrass, 0.75-1.25; hybrid bermudagrass, 0.5-0.75; St. Augustinegrass, 1.0-1.5; bluegrass common types 1.5-2.5; and tall fescue, 1.5-3.0. If a lawn is changed to another turf species, the manager must become accustomed to the appearance of the new turf at the correct cutting height. Cool season grasses may not last long if mowed as short as bermudagrass!

Cutting height may be adjusted for the time of year. Cool season turfs are more resistant to heat stress if cutting height is raised during the summer. Raising the height to 2-3 inches is an important management technique to maintain tall fescue, ryegrass and bluegrass during the warmest months in the San Joaquin Valley.

Two types of mowers are available. Reel mowers give a cleaner cut, require less power than rotary mowers, and are necessary to achieve cutting heights less than one inch. Using rotary mowers or lightweight reel mowers on hybrid bermuda can result in a gradual rise in effective cutting height with a thatch problem underneath. Heavier, more expensive commercial reel mowers are necessary for this turfgrass.

How often should turf be mowed? A rule of thumb is to remove no more than 40% of the leaf area in one mowing. For example, a two-inch turf could be slightly over three inches before mowing. If turf is mowed with reasonable frequency, clippings do not need to be collected. Clippings do not contribute to the thatch layer unless excessively long (several inches). Short clippings have high water content and are relatively high in nitrogen. They break down rapidly, returning nitrogen and organic matter to soil.

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 the presence of a specific disease organism or insect. Consequently, treatment options are very 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 occurrence of certain species. Considering the location of native stands of coast redwoods, the generally 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 a pattern like 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 percentage increases of individuals struggling with the environment, as exhibited by poor growth and appearance. 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 five 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 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 *Phytophthora 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.) Of course sufficient water is important, but landscape plantings with brown redwoods almost invariably appear to receive sufficient irrigation. 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.

Landscape Horticulture Class

University of California Cooperative Extension (UCCE) is again offering the class which has been known as Master Gardener I, to begin Thursday, August 25. Sixteen class sessions will be held at the UCCE office, 1031 S. Mt. Vernon Ave, from 6-9 pm, with discussion of topics including plant selection, turfgrass selection and maintenance, irrigation, pest management, vegetable gardening, fruit trees, and troubleshooting. The class cost is $70. Registration and payment will be handled at the first class meeting; however, we ask interested persons to call ahead of time (661 868-6200) to pre-register. If space becomes limited, early reservations will have precedence, i.e. first-come, first-served. For further information please contact John Karlik, jfkarlik@ucdavis.edu, or at 661 868-6220.

Woolly Whitefly: A New Pest on Backyard Citrus in Bakersfield

David Haviland – University of California Cooperative Extension, Kern County

Woolly whitefly is a new pest of all types of citrus, and has been found in the urban areas around northeast Bakersfield. It is easily recognized by the white, crystallized excretions produced by the nymphs on the undersides of leaves. These white crystals are extremely sticky due to a high sugar content. In the fall these sugars support the growth of sooty mold which can turn an entire leaf surface black.

Identification and Life Cycle: Woolly whitefly adults are good fliers and look similar to adults of other whitefly species. The difference is that woolly whitefly is only found on citrus, whereas other whiteflies can be found on numerous host plants. Adult females lay eggs on the underside of citrus leaves in a semi- or complete circle. Eggs hatch into crawlers (a motile stage) that find a feeding site and settle down. Once settled they lose their legs, begin to develop as nymphs, and excrete white protective filaments and honeydew for which the term 'woolly' was derived.

Damage: Woolly whitefly is primarily a concern to homeowners due to its unsightliness and the copious amounts of sticky honeydew found on surfaces near and under the infested leaves. Woolly whitefly does little harm to the tree itself. However, over time, heavy populations can weaken a tree due to direct feeding, or by causing the tree to shed leaves that are rendered useless by being covered in black sooty mold.

Biological Control: The primary method of control of woolly whitefly, used internationally and elsewhere in California, is through the use of biological control. Tiny wasps, which cannot sting people, lay eggs that hatch and feed on the whitefly, thus killing them. These parasites are not currently found in Bakersfield, and efforts are underway to import them into Kern County.

Insecticides and Water: There are currently no insecticides available over-the-counter to homeowners that have proven effective against woolly whitefly. The best control option is to hose down the undersides of leaves with high pressure water every 1 to 2 weeks. This will kill some whiteflies, but primarily serves to dissolve the sticky white crystals of honeydew. Washing leaves maintains the appearance of trees, removes stickiness, prevents growth of sooty mold, and does so without the use of pesticides (that are not effective anyway). In the long term it is hopeful that wasps introduced into Bakersfield will be adapted to our climate and prove the level of natural suppression found elsewhere in the state.

Sudden Oak Death

Sudden Oak Death is a major disease problem of oaks in coastal California. Sudden Oak Death has not been identified in Kern County, and is unlikely to be a significant problem here for several reasons, including lack of susceptible oak species, lack of understory plant species that serve as sources of infection, and Kern's warm dry climate which is unsuitable for development of the disease. Browning of redwood trees in Kern County has not been identified with Sudden Oak Death.

However, since Sudden Oak Death is a major problem in parts of California, I offer the following background information, supplied by the California Oak Mortality Task Force. Again, please keep in mind that this information is most applicable to areas where Sudden Oak Death has been found – not Kern County so far.

Sudden Oak Death is currently found in 14 California counties from Monterey to Humboldt and in a small portion of southwest Oregon, and is caused by the pathogen *Phytophthora ramorum*. Sudden Oak Death has resulted in the death of tens of thousands of tanoak (*Lithocarpus densiflorus*) and coast live oak (*Quercus agrifolia*) trees. In addition, more than 35 other plant species are susceptible to the pathogen, yet most of these species suffer only minor damage, limited to leaf spots or twig dieback.

P. ramorum affects different species in different ways. It can be lethal to tanoak, coast live oak, California black oak, Shreve oak, canyon live oak, and madrone saplings, while it may cause only a minor leaf disease for other hosts, such as California bay laurel, coast redwood, and Douglas fir. The nature and progression of the infection varies in each host species, and even within a given species. Infected hosts may not display symptoms for a year or more after initial infection. To date, trunk cankers have only been found on the following tree species in California: tanoak, coast live oak, Shreve oak, canyon live oak, and California black oak. Of these, tanoak is the species most likely to be killed.

Weather patterns may cause fluctuations in pathogen activity and infection rate. *P. ramorum* thrives in wet or moist climates, cool temperatures, and living plants. Its spores can be found in soil and water as well as plant material. The risk of pathogen spread is greatest in muddy areas and during rainy weather where spore-producing hosts are present. *P. ramorum* may be transported to new areas when infected plant material or infested soil is removed.

Because *P. ramorum* may be spread through the movement of infested soil and plant materials, state and federal regulations are in place to control the potential spread of the pathogen to uninfested areas. *P. ramorum* host species plant material (except seeds and acorns) is regulated by the California Department of Food and Agriculture (CDFA) and the U.S. Department of Agriculture, Animal and Plant Health Inspection Service (USDA APHIS). Quarantine regulations are in place for the infested counties, and before moving susceptible plant material out of the regulated area, the local Agricultural Commissioner must be contacted for a permit.

If you are outside of an infested area, your tree could still be infected with *P. ramorum*, but it would be less likely. Although positive confirmation can only be done through laboratory testing, diagnosis of *P. ramorum* based on visual symptoms can justify taking preventative action if you live in a generally infested area. If you ask a tree care professional to make such a judgment, determine what training or qualifications enable him or her to do this. *P. ramorum* symptoms are difficult to distinguish from a number of other common diseases. *P. ramorum* diagnosis must be based on a careful visual inspection of symptoms, informed sampling, and laboratory testing. Misdiagnosis is common and should be avoided or trees may be removed or treated unnecessarily. Arborists may be confident in their preliminary diagnosis and the need for laboratory analysis if they observe multiple external and inner bark symptoms as well as symptoms on other hosts in the immediate area.

Exactly how the pathogen spreads to oak trees is unknown, but it is suspected that neighboring non-oak host plants may be a source of infection for oak trees. However, because this relationship is poorly understood, large-scale removal of non-oak host plants is not being recommended as a way to prevent disease spread. Currently, it may be best to plant non-*P. ramorum*-hosts under or adjacent to oak trees. Rhododendron, for example, is a commonly planted ornamental that is a host for *P. ramorum*, and it is possible that an infested rhododendron could infect a nearby oak. Additionally, the summer watering necessary to keep lawns and non-native ornamental shrubs, such as camellias, alive under an oak tree severely predisposes the oak to other diseases.

The use of insecticides to prevent *P. ramorum* infection is unjustified and without merit. However, the treatment of individual, high-value landscape trees displaying early bleeding symptoms of Sudden Oak Death may be justified to control damage from secondary bark beetle attacks. If an insecticide is to be used, apply it only if the disease is not at an advanced stage and realize it may only prolong the life of the tree for a relatively short period of time.

Current information indicates that non-oak foliar hosts contribute the most to disease spread, so removing infected oak trees will probably have little or no impact on local disease levels and spread. However, an important consideration with respect to any tree is whether or not it presents a hazard to life or property. All trees present some hazard, depending on the tree's structural integrity and its potential to do harm should it fail or portions break off. Preliminary research has shown that trees infected or killed by *P.*

ramorum are prone to rapid decay and unpredictable failure. Green infected trees, as well as trees already dead from *P. ramorum* and/or secondary pests, are at increased risk of trunk and limb breakage.

Disposal of infested material is extremely important because branches, twigs, and leaves from California bay laurel, rhododendron and other host plants may harbor *P. ramorum*, even after they are removed from the plant. If infested plant debris or infected live plants are moved, they may inadvertently transfer the pathogen to uninfested areas. Unfortunately, *P. ramorum* has been present in many areas of coastal California for a decade or longer, making complete eradication impossible. In infested areas, the best option is to leave infested material on site, chipping the small material (for use as ground cover) and using larger pieces for firewood. Composting can also successfully kill the pathogen, but the compost must reach a temperature of 130° F throughout the pile for 2 weeks. This is probably not possible or practical in a small composting site that may not have the proper mix of woody and green materials, nor be able to be turned often enough. Since innoculum levels are already thought to be high, leaving the additional innoculum from the infested plant material on site will not significantly worsen the local disease conditions.

For further information, you may check the Sudden Oak Death website at www.suddenoakdeath.org, or contact Janice Alexander, Sudden Oak Death Outreach Coordinator, UC Cooperative Extension, Marin County, (415) 449-3041.

John Karlik
Environmental Horticulture/Environmental Science