

# General Watering Guidelines

## Eucalyptus Species in Southern California Urban Landscapes



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### General Information

Eucalyptus species are found growing naturally in Australia under a wide variety of environmental conditions. Conditions can range from hot arid locations to moist humid regions of the continent. Eucalyptus species planted in southern California landscapes are mainly those naturally found in the arid regions of Australia, making them particularly well-adapted for our Mediterranean climate. Some common species found in southern California landscapes include *Eucalyptus camaldulensis*, *E. citriodora*, *E. cladocalyx*, *E. globules*, *E. leucoxylon*, *E. maculata*, *E. rudis*, *E. sideroxylon*, and *E. viminalis*. Generally, most eucalyptus species are considered to be drought tolerant once established as root systems are extensive, allowing for water to be extracted from the soil at considerable depths. Many of California's historically significant eucalyptus species are no longer widely sold in the nursery trade as a result of infestations of invasive insect species, such as the longhorned borer, redgum lerp psyllid, and the tortoise beetle.

### Watering Requirements

Research has shown that eucalypts effectively remove water from the soil through an extensive lateral root system as well as a deep tap root system as the tree matures (Knight, 1999). The lateral root system allows for water uptake over the large canopy area of a single tree or stand of trees while the tap root system harvests water from deeper soil depths. During drought years when supplemental irrigation is not provided, eucalyptus roots have been shown to remove water from greater depths than in wetter years. This extensive root system makes eucalypts very efficient at using the water made available either through rainfall or irrigation. Over-irrigation in urban landscape situations stimulates fast and excessive growth in eucalypts resulting in plants requiring more pruning, more abundant leaf litter, and can make trees more appealing to insects such as the redgum psyllid.



Root growth in most trees is concentrated in the top 3 feet of the soil, however, poor irrigation practices that keep the soil surface too wet and the lower depths too dry will result in root growth being concentrated near the surface. Unfortunately frequent short irrigation applications are commonly done in landscapes, leading to trees with shallow root systems unable to adjust too quickly to less frequent irrigations. Compacted soil has also been shown to limit the rooting depth of most eucalyptus species (Nambiar, 1981) and should be considered when developing an irrigation management plan.

The goal when irrigating eucalypts should be to wet the soil to a significant depth by applying water slowly over a longer period. Deep infrequent irrigation will allow the tap root system to develop expanding the soil area available for the abstraction of water. It is difficult to accomplish this task utilizing typical sprinkler heads as irrigation water is delivered at too rapid a rate for most soils to absorb, especially tree specimens planted on slopes. Drip irrigation, low

precipitation rate heads, or soaker hose are better methods of delivering water slowly to wet the soil at deeper depths.

Watering guidelines for mature eucalyptus trees or stands growing in an urban environment should focus on providing adequate moisture, especially during the hot dry summer months. However, it should be made clear that eucalypts will utilize excess water applied to the soil even though it is not necessary for maintaining a healthy tree. Normal rainfall years generally provide sufficient soil moisture for eucalypts during the rainy season. However, years when normal rainfall has not occurred by mid to late February, trees should receive supplemental irrigation to make up the difference. It is important to irrigate away from the trunk at the dripline (outer canopy) and let the soil dry in between irrigations as waterlogging the soil can result in susceptibility of some species to root and crown pathogens.

## Irrigating Eucalyptus Based on an Allocation

In order to maintain healthy eucalyptus trees sufficient water must be supplied to prevent a tree from becoming water-stressed. Water stress will occur during hot dry summer months or under strong Santa Ana wind conditions, especially in years when insufficient winter rains occur.

An example of the average irrigation needed for a stand of eucalyptus trees in an urban landscape located in the foothills of Orange County is included below. The values are calculated utilizing historical average daily evapotranspiration (ET) rates. This should be taken into account as extreme environmental conditions will alter the watering requirements, requiring more or less water. It should be clear from the data below that if average rainfall occurs (11"-15") during the winter months, supplemental irrigation will only be required in the summer months. It should also be noted that Irvine Ranch Water District's (IRWD) allocation is based on a warm season turfgrass crop coefficient that adjusts weekly to account for weather fluctuations. The crop coefficient for warm season turfgrass (i.e. Bermuda, St. Augustine) utilized by IRWD to determine baseline allocations, ranges from 57% to 72% with an average of 65%. The irrigation amounts shown below for eucalyptus are calculated utilizing an average crop coefficient of 0.6 or 60%. If possible, trees should be irrigated separately from other plant material in order to apply water deeply and infrequently.

As an example, watering in July would consist of applying approximately 1.5 inches of irrigation water every 7-8 days. This would result in approximately 6 inches of irrigation water applied during the month. Irrigating with pop-up sprinklers with an application rate of 2 inches per hour would require running the system for 45 minutes to apply 1.5 inches of water. Under most circumstances, irrigating for this length of time will result in runoff and therefore the runtime should be divided into multiple shorter durations over a two day period. Irrigating most soils in the Lake Forest area with 1.5" to 2" of water should wet the soil to a depth of 1 to 2 feet. Soil types can vary significantly from one location to the next so a soil probe should be utilized to verify the soil wetting pattern.

Eucalyptus trees irrigated at crop coefficients closer to those established for cool season turfgrass (i.e. tall fescue) will need to adjust to the lower crop coefficient over a period of time. For example, trees currently irrigated at above 80% of  $ET_0$  (cool-season turfgrass) should adjust irrigation to reduce the amount in increments of 10% of  $ET_0$ . Evaluate the appearance of the trees for a period of one to two months at the new irrigation amount. If the trees look good, the amount can be reduced another 10% until you eventually reach 60%. Trees should be monitored closely for stress (i.e. leaf drop) during this adjustment period. Most eucalypts, especially those grown in natural environments, do well under crop coefficients lower than 60%.

$ET_0$  (month) = Calculated from average daily ET rates (adapted from Harris and Coppick 1977, p.2)

Kc (crop coefficient) = 0.6      Irrigation efficiency = 71%

## Estimated Irrigation (inches) Required to Maintain a Healthy Mature Eucalyptus in Zone 10 (Southern Inland Valleys)\*

January	1.5 inches/month	February	2.1 inches/month
March	2.8 inches/month	April	3.5 inches/month
May	4.2 inches/month	June	5.1 inches/month
July	5.8 inches/month	August	5.8 inches/month
September	4.4 inches/month	October	3.1 inches/month
November	2.0 inches/month	December	1.5 inches/month

\*Orange County is divided into Zone 9 (Southern Coast) and Zone 10 (Southern Inland Valleys). Eucalyptus growing in coastal cities will require slightly less water than those grown further inland closer to the foothills.

## Influence of Watering on Eucalyptus Pests

### *Longhorned Borers, Redgum Lerp Psyllid, and Tortoise Beetles*

Research has shown that trees that are heavily stressed are more prone to attack than those that have been given adequate water. UC IPM suggests providing supplemental water during prolonged dry periods especially if rainfall has been below normal. Although the soil type, site, and the species are all important in determining the amount of water the tree requires, watering the tree with the same frequency and duration of water used for a lawn will result in an unhealthy tree. It is also important to avoid cutting off irrigation to trees that have been regularly irrigated as they will quickly become stressed.

Leaf feeding insects, such as the redgum lerp psyllid, favors lush new growth resulting from a combination of excess irrigation and fertilizer applications. If possible avoid the application of nitrogen fertilizers in order to avoid pushing new growth that will be attractive to these insects. If you must fertilize lawns or other understory plants, utilize slow-release formulations as eucalyptus roots will easily assimilate any excess nitrogen in the soil resulting in lush succulent growth.



Detailed eucalyptus pest information can be viewed and downloaded for free from the University of California Statewide Integrated Pest Management web site at <http://www.ipm.ucdavis.edu/>.



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