



Minimum Irrigation Needs of Landscape Palms

Co-Principle Investigators

Dennis Pittenger, Area Environmental Horticulture Advisor
Cooperative Extension
Central Coast & So. Region/Los Angeles Co./UC Riverside Dept. of Botany & Plant Sciences
Batchelor Hall Extension
Riverside, CA 92521
dennis.pittenger@ucr.edu (951) 827-3320

Donald Hodel, Environmental Horticulture Advisor
Cooperative Extension Los Angeles County, 4800 E. Cesar E. Chavez Avenue
Los Angeles CA, 90022
drhodel@ucdavis.edu (323) 260-3405

Jim Downer, Environmental Horticulture Advisor
Cooperative Extension Ventura County
669 County Square Drive, #100
Ventura CA, 93003-5401
ajdowner@ucdavis.edu (805) 645-1458

Project Summary

Palms are important constituents of California's landscape plant palette, but there is limited research-based information on how to irrigate them effectively. This project will determine the minimum amount of water that landscape palms need to remain healthy and aesthetically acceptable. Established plants of five species of palms common in the Southern California landscape will receive three irrigation treatments of 0%, 25%, and 50% of real-time reference ET estimated from an on-site CIMIS station. The five species of palms are *Archontophoenix cunninghamiana* (king palm), *Chamaerops humilis* (Mediterranean fan palm), *Trachycarpus fortunei* (windmill palm), *Syagrus romanzoffiana* (queen palm), and *Washingtonia robusta* (Mexican fan palm). The number of new leaves, total number of leaves, caliper at base, height, estimated crown volume, visual quality ratings, and leaf blade size will be collected quarterly, enabling an evaluation of the species' responses to the treatments. Data will be subjected to ANOVA.



Background and Objectives

Palms are important and expanding constituents of California's landscape plant palette. However, there is limited research-based information available to guide effective maintenance practices for palms, especially in areas related to soil-water management. Current information on the water requirements of landscape palms is based largely on observational data since there has been no research on the quantitative water needs of amenity palms. With water conservation growing in importance, the information derived from this study will be of great value to landscape managers, landscape architects, and water agencies as they attempt to maintain functional landscapes and simultaneously conserve water in the landscape.

The objective of this study is to determine the minimum amount of irrigation required to maintain acceptable growth and quality of five species of commonly used landscape palms.

Methods and Procedures

Established plants of five species of palms common in the Southern California landscape will receive three irrigation regimes. The five species of palms are *Archontophoenix cunninghamiana* (king palm), *Chamaerops humilis* (Mediterranean fan palm), *Trachycarpus fortunei* (windmill palm), *Syagrus romanzoffiana* (queen palm), and *Washingtonia robusta* (Mexican fan palm). The three irrigation treatments are 0%, 25%, and 50% of real-time reference ET (ET_o) estimated from the on-site CIMIS station.

The study will be conducted using a portion (9 rows and 135 trees) of the existing palms in the amended backfill study site to form a split-plot design with 3 replications of 3 irrigation treatments and 3 trees per species per replicate. Each row will be an irrigation treatment replicate with 3 trees of each of the 5 species present in each row. Thus, there will be 15 trees per row. The trees are planted 4.6 m (15 ft) on center in rows 4.6 m (15 ft) apart.

Daily ET_o values will be multiplied by the fraction of ET_o assigned for each treatment (0.5 and 0.25, respectively) and accumulated. When the accumulated amount reaches 4.0 cm (1.6 in), an irrigation of 4.0 cm (1.6 in) will be applied to trees in that treatment. This amount of water is approximately 50% of the available water held in the top 61 cm (24 in) of soil determined by moisture release calculations. No adjustment factors will be employed, and no additional water will be applied to compensate for non-uniformity of the irrigation system. Rainfall of 25 mm (0.1 in) or more per day will be subtracted from the cumulative amount of each treatment.

Irrigation will be applied by a series of fixed-spray shrub sprinkler heads which produce a strip irrigation pattern of 6.1 m (30 ft) x 1.2 m (4 ft) along each row (irrigation replicate).

The number of new leaves, total number of leaves, change in height, visual quality ratings, and plant water status measurements will be recorded seasonally, enabling an evaluation of the species' responses to the treatments. Data will be subjected to ANOVA.

