

## ***Reduced Water Consumption by Acclimatized Landscapes***

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### ***Hypothesis***

The research described here tests the hypothesis that landscape plants can be acclimated to less than  $0.25 ET_0$  by ensuring adequate annual leaf renewal. We accomplish this by applying irrigation to match  $ET_0$  in the winter months, during the normal rainy season, then reducing irrigation to  $0.1 ET_0$  during the remainder of the year.

### ***Experimental design***

One-gallon containers of two species of landscape plants (*Viburnum* and *Leucophyllum*) were purchased from a San Diego nursery and transplanted into bottomless 20-gallon containers which were buried to the soil line and filled with parent soil. The containers were covered with plastic lids to exclude rainfall. A drip irrigation system was installed so that each container could be irrigated according to one of nine regimes (Table 1, following page).

Since the period from November to March is considered to be the rainy season throughout most of California, the irrigation regimes in this study were designed to mimic conditions ranging from normal rainfall throughout winter to severe drought (which can mean either early cessation of rainfall or low rainfall throughout the winter). Throughout the April-October interval, we will attempt to adjust the irrigation regimes such that Treatments 1, 3 and 5 will receive  $0.1 ET_0$  (our current calculations show that the amounts delivered through May are between  $0.2$  to  $0.3 ET_0$ ). Treatments 2, 4 and 6 will receive no supplemental irrigation during the April-October interval.

The plants in the last three treatments (indicated by -10, -30, and -50 cb in Table 1) were considered established by the end of winter 1993-1994, and now receive irrigation according to soil moisture demand,

**Table 1.** Irrigation Water (gallons per plant) applied to viburnum and leucophyllum between November 1993 and May 1994.

Treatment	Nov 93	Dec 93	Jan 94	Feb 94	Mar 94	Apr 94	May 94
1	8.5 <sup>a</sup>	0	0	0	0	8.5	6.7
2	8.5	0	0	0	0	0	0
3	8.5	6	6	0	0	8.5	6.7
4	8.5	6	6	0	0	0	0
5	8.5	6	6	8	8	8.5	6.7
6	8.5	6	6	8	8	0	0
-10 cb	8.5	6	6	8	8	8.1	6.2
-30 cb	8.5	6	6	8	8	4.5	2.9
-50 cb	8.5	6	6	8	8	8.5	3.8

<sup>a</sup>Gallons applied per plant

using tensiometers that control solenoid valves. Clearly, the -30 cb treatment is not being properly controlled; the tensiometer for that treatment will be replaced.

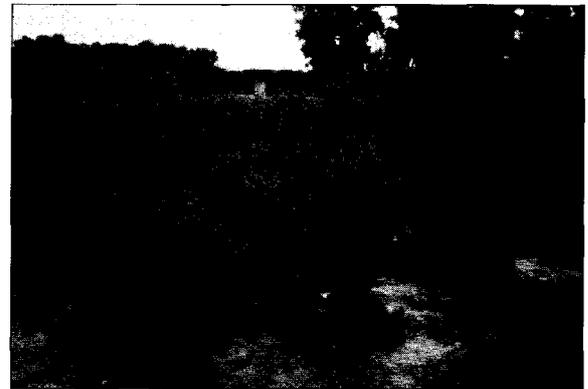
### Results

During the first year of observation we have found no differences in appearance of two species of landscape plants (*Viburnum* and *Leucophyllum*) that received substantially different amounts of simulated



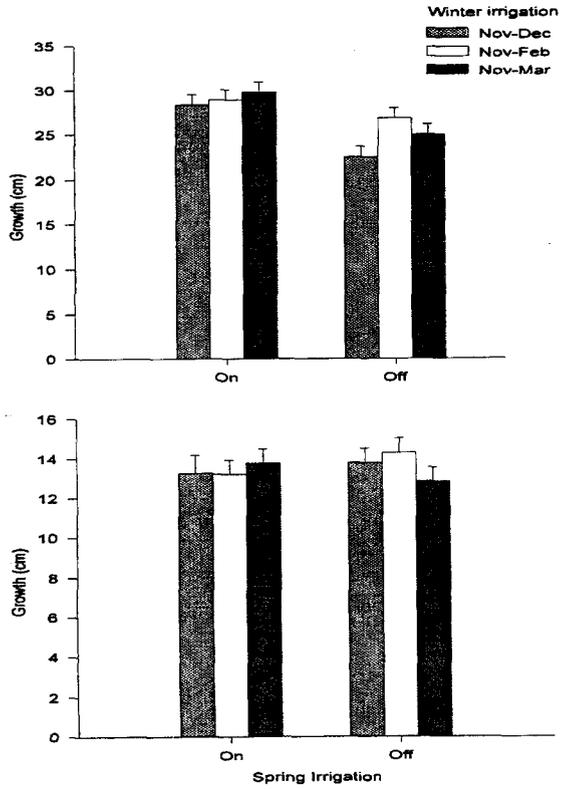
**Figure 1.** *Viburnum* plants in experimental plots. Note the plastic lids covering the buried containers to exclude rain, and the drip system to provide irrigation.

rainfall during the winter and following spring. None of the treatments received more than 0.4 ET<sub>o</sub>, and we anticipate that a more accurate calculation will show that the plants used close to 0.2 ET<sub>o</sub>. Appearance of the plants was assessed quantitatively by measuring light absorbance to estimate leaf



**Figure 2.** *Leucophyllum* plants in experimental plots. Note the plastic lids covering the buried containers to exclude rain, and the drip system to provide irrigation.

chlorophyll content. Figures 1 and 2 illustrate the uniform appearance of all irrigation treatments. Growth was estimated by measuring stem elongation between April 1 and July 15, 1994. There were small but statistically significant increases in stem elongation for *viburnum* plants receiving supplemental irrigation in the spring (Fig. 3), but no differences in *leucophyllum* (Fig. 4, following page). We should emphasize, however, that the measured differences in growth were not apparent to the eye. Furthermore, the landscape value (foliar and flowering characteristics) of the plants in all treatments was similar. Based on prior experiences, we expect differences among treatments to become apparent later this summer or fall.



**Figure 3.** Stem elongation in *viburnum* (top) and *leucophyllum* (bottom) as a function of irrigation regime.

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