

Australian Plants for Central Valley Gardens: A Living Exhibit at the U.C. Davis Arboretum

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The Davis Arboretum of the University of California occupies approximately 125 acres on the banks of the old north fork of Putah Creek, near the center of the Great Central Valley of California. The Arboretum serves as a resource for the educational and research functions of the University, and contains documented collections of wild-collected plants from all parts of California and other Mediterranean climate areas of the world. As the largest botanical garden in the Valley, the collection also serves as a source of information for horticultural and landscape professionals, resource managers, and residential gardeners.

The flora of Australia's Mediterranean-type climates holds great potential for horticultural use in interior California. In the course of our research we have found limited information about the culture of Australian plants outside their native range and nothing about their tolerance for the environmental conditions of California's Central Valley. Demonstration plantings of Australian plants in California, notably those at the U.C. Santa Cruz Arboretum, U.C. Berkeley Botanic Garden, Strybing Arboretum and the Huntington Gardens are all located near the coast, where climate and other cultural conditions are less extreme than in the Valley.

Project goals and objectives

The goals of this project were two-fold. First, we wished to establish a test planting of Australian species where plants of the same species could be irrigated at different levels to find the optimum irrigation regime under our conditions. Determination of the best irrigation level will be based on plant evaluation after a winter and summer of growth using overall plant appearance, relative amount of growth, exhibition of chlorosis and plant survival as criteria. Second, our educational goals were as follows:

- Promote more sustainable landscapes using drought-adapted plants

Table 1: Australian Plant Species Replicated in High, Medium and Low Irrigation Areas

Anigozanthos 'Regal Claw'
Brachysema lanceolata
Correa 'Ivory Bells'
Correa pulchella 'Port Lincoln'
Correa mannii
Dianella revoluta var. revoluta
Dodonaea procumbens
Eremophila weldii
Hardenbergia violacea 'Icicle'
Hardenbergia violacea 'Rosea'
Kunzea parvifolia
Kunzea pomifera
Leptospermum rupestre
Melaleuca pauciflora
Melaleuca wilsonii
Sollya heterophylla 'Alba'

- Educate visitors about the horticultural value of Australian plants
- Enhance the value of the Arboretum collection to educators and researchers through the addition of testing and interpretation of the planting.

Discussion

Previously untested species and varieties were obtained and grown by the Arboretum staff from cuttings obtained from the U.C. Santa Cruz Arboretum as well as from commercial sources (Table 1). The design called for replicated plantings to allow evaluation of growth under high, medium and low irrigation. After the initial establishment period, plantings will be irrigated as a percentage of reference evapotranspiration (ET_0) at these three levels: low at 0.1 to 0.3, medium at 0.4 to 0.6 and high at 0.75 to 0.9 percent of ET_0 . Automatic irrigation stations programmed in conjunction with data on ET_0 and precipitation downloaded from the UC IPM California Weather Database will provide information necessary to make accurate seasonal adjustment of water application. The plants will also be evaluated for low temperature tolerance and for their response to irrigation by water high in boron and bicarbonate ions.

Simultaneously, the planting will educate visitors about the beauty and horticultural potential of

Kangaroo Paws and Bottlebrushes

Why Choose Australian Plants?

Australian plants are good choices for Central Valley gardens, because parts of Australia have the same climate patterns as we do—cool, wet winters and hot, dry summers. By choosing well-adapted plants for our home gardens, we reduce the need for irrigation, chemical fertilizers, and pesticides, and also the amount of time we need to spend on garden maintenance.



Kangaroo paws (*Anigozanthus*)

Living with Heat and Drought

Many Australian plants have developed the same kinds of adaptations to heat and drought as plants from California. They may have tough, leathery leaves with waxy or oily coatings to reduce water loss through evaporation. Some have gray, white, or silvery foliage to reflect sunlight and maintain a low temperature.



Bottlebrush (*Callistemon brachyandrus*)

A Test Garden

Australia has many beautiful and interesting native plants that have rarely or never been used in California gardens. In this part of the Arboretum we are testing plants native to Australia to determine how they will perform in our climate and soil conditions. There are three planting areas with the same plants in each, so we can compare their growth rate and appearance with low, medium, and high levels of irrigation.

University of California  Davis Arboretum

This project made possible by the Elvenia J. Slosson Endowment Fund

Figure 1. A primary “conceptual organizer” sign will introduce the public to the Australian collection and to the organizing concepts behind the planting.

Australian plants. These plantings are arranged in an aesthetically pleasing design within which are embedded the three replicate plantings. To make plant information accessible to casual visitors, plants are labeled with common and Latin name, and plant family. Laminated plastic plant labels were produced and installed according to standard Arboretum format. In addition, interpretive signage will explain the educational messages and orient visitors. Educational messages selected include reasons to use Australian plants, plant adaptation to drought and the goals of the test garden (Figure 1). The Arboretum is experimenting with a new and reportedly better sign material for the first time as part of this project. Using a technique sometimes referred to as “floor graphics”, an electrostatic printing

process will apply the image to a special film which is then applied to a di-bond substrate of thin sheet metal with UV resistant plastic. Signage will be mounted in the Arboretum’s standard vandal-resistant metal frames.

A primary “conceptual organizer” sign will introduce the public to the collection and to the organizing concepts behind the planting. Three other signs will function to explain the experiment to help people draw meaning from the display. In each of the three irrigation sections a sign will identify how irrigation in that area compares to the amount of water used by a well-watered lawn (Figure 2). Visitors themselves will be able to compare the effect of the varying irrigation levels on plant growth.



Figure 2. Signs in each of the experimental irrigation sections of the Australian collection will identify how irrigation in that area compares to the amount of water used by a well-watered lawn.

Continued work

We feel that this project has been very successful in creating an experimental planting which is fully accessible to the public. In this attractive landscape, people will be able to see for themselves the beauty of water-conserving Australian plants and the variable responses of plants to differing amounts of water (Figure 3). The plants will be subjectively evaluated after a growing season for their response to watering as well as sensitivity to frost and to boron and high bicarbonates in the irrigation water. This information will be published in the *Davis Arboretum Review* and other relevant trade publications.

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Figure 3. The Australian Test Garden. Australia has many beautiful and interesting native plants that have rarely or never been used in California gardens. In this part of the Arboretum we are testing plants native to Australia to determine how they will perform in our climate and soil conditions. There are three planting areas with the same plants in each, so we can compare their growth rate and appearance with low, medium, and high levels of irrigation.