

# **Groundcovers for Water Conserving Landscapes**

## Principal Investigators

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## Location

U.C. Riverside, Riverside, CA

## Project Overview

This study of 17 groundcover plant materials and one turfgrass managed as a groundcover is designed to evaluate their adaptation to the inland valley climate of Southern California and their performance at a reduced level of irrigation (see table). The plants represent a mix of native, so-called California-Friendly, and non-native as well as woody and herbaceous plant materials. Replicated field plots were planted in late 2009 through early 2010 and have been challenged with irrigation of 60% of real-time reference evapotranspiration (ET<sub>o</sub>) since mid-May 2011.

The study objectives are to: (1) substantially expand the knowledge of groundcover water requirements; (2) evaluate the adaptation and performance of 17 groundcover and one turfgrass species in the inland valley climate when receiving water in the amount of 60% ET<sub>o</sub> or less; and (3) evaluate the relative carbon fixation potential and water use efficiency among the plant species.

We are measuring plant response to irrigation by recording plant quality ratings of each species following to established and accepted protocol. Plant quality of each plot will be rated monthly on a scale of 1 to 9, with 9 = optimum/best plant quality and 1 = dead/worst plant quality. To estimate carbon fixation and water use efficiency of selected plant materials, a LI-COR 7500 open path infrared carbon dioxide and water analyzer will be used to measure carbon flux and evapotranspiration (ET) within each plot on a bi-weekly basis May 2011 to June 2012.

## Study Design

- 18 species
- 1 irrigation treatment; 3 replications of each species
- 54 sub-plots 10 ft. × 10 ft. each
- Sprinkler irrigation
- Plants transplanted from #1 containers or from flats as rooted cuttings 2009-2010
- No soil amendments

## Background

Landscape groundcovers are a diverse group of trailing or spreading plants that naturally form a continuous soil covering. They can range in height from about six inches to nearly three feet tall, and may be woody, herbaceous, or succulent. Groundcovers are often looked upon as turfgrass substitutes in irrigated landscapes of the southwestern United States based on the presumption they require less water and other inputs to maintain high aesthetic quality. There

is limited research-based information quantifying water requirements and climatic adaptability of the many plants that are potential landscape groundcovers. Unlike turfgrass, much of the information describing groundcover irrigation needs is anecdotal and non-quantitative. Thus, it can be impossible to accurately compare water needs of many groundcovers to those of turfgrass.

In a previous study, we looked at six groundcovers representing a range of growth habits and potential adaptations to drought to compare their minimum water needs. We found they varied widely and unpredictably in their minimum water needs and drought responses. We concluded that many groundcover species (in our study *Vinca major*, *Baccharis pilularis*, *Drosanthemum hispidum*, and *Hedera helix*) are able to maintain acceptable landscape performance when presented with significant drought and have minimum water needs around 30-40% of ETo, which is similar to that of warm-season turfgrass. Other species (exemplified in our study by *Potentilla tabernaemontanii* and *Gazania hybrid*) are not able to withstand any drought and have minimum water needs similar to cool-season turfgrasses. Thus, the idea is not true that groundcovers in general require less water than turfgrass to remain aesthetically appealing in the landscape.

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