

Frequency and Diversity of Plant Life Forms in Residential Urban Landscapes

K. A. Peterson, L. B. McDowell, and C. A. Martin

Department of Plant Biology, Arizona State University

Introduction

Rapid community change is occurring in many areas of metropolitan Phoenix. New urban social and ecological communities are replacing natural ecosystems. Vegetation found in residential landscapes can significantly contribute to urban climates though little is known about the structure of these communities (Wilwers 1990). Phoenix is often viewed as a desert oasis providing many open green space areas for its residents. Many residents find mesoscape plantings with large deciduous shade trees and turf more appealing than xeriscaping with desert adapted plants. Conversely, some local municipalities mandate xeriscape plantings though it is not readily apparent if this type of planting design results in water conservation. A subset of residential urban landscapes in the Phoenix metropolitan area was analyzed in 1998 to provide a base data set of frequency and diversity of landscape plants as well as measures of canopy cover and irrigation application volumes.

Methods

Mesic and xeric urban residential landscapes were chosen in south Tempe and Phoenix suburbs. Mesoscapes had turf and high water use plants while xeriscapes were chosen based upon desert-adapted plant recognized by local municipalities and the absence of turf. All landscapes were installed between 1985 and 1995. Total landscaped surface area and canopy cover was measured.



Figure 1. A Precision series water meter, installed at the irrigation back flow prevention device, which measures the volume of water applied to landscaped surface areas.

Species diversity as well as frequency of trees, shrubs, and ground cover data were collected. Total monthly irrigation application data were collected by installing a Precision 5/8" PPM series water meter at the landscape irrigation back flow prevention device (Figure 1). Statistical analysis was conducted using SAS T-tests.

Results

Landscaped surface area and canopy cover were higher for mesoscapes than xeriscapes. Mesoscapes had more trees but fewer shrubs and ground covers than xeriscapes (Table 1). Mean turf cover for mesoscapes was 36% of landscaped surface area. Species present in mesoscapes were generally not present in xeriscapes, though species diversity was similar between the two landscape types and averaged 22 species per residential landscape. Xeriscapes had a higher monthly irrigation application volume than did mesoscapes (Figure 2).

Table 1. Mean numbers for mesic and xeric landscape area and canopy cover. Numbers of trees, shrubs, and ground cover plants per 100 m² of landscape surface area.

	Landscaped Surface Area m ²	Canopy Cover m ²	Trees	Shrubs	Ground Cover
Mesocape	508	316	2.65	10.8	0.78
Xeriscape	313	136	2.12	12.08	1.13

Conclusion

Residential landscape watering practices appear unrelated to landscape design type.

Literature Cited

Wilmers, F. 1990. Effects of vegetation on urban climate and buildings. *Energy and buildings* 15-16: 507-514.

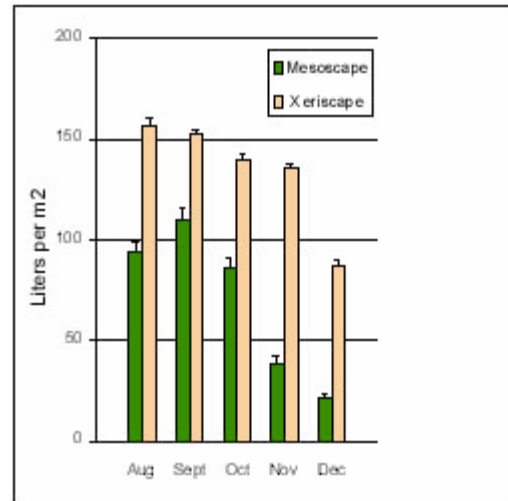


Figure 2. Average monthly irrigation application volumes in liters/m² for landscaped surface area at mesic and xeric sites.