

# Landscape Irrigation Recommendations Expert Panel vs Field Trials: Implications for New Ornamentals

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## Background

The Water Use Classification of Landscape Species (WUCOLS) is a listing of irrigation recommendations for plants. In California WUCOLS is the main reference for estimating water use in new landscapes. WUCOLS classifies plants in categories of water need, based on percentages of reference water use (Table 1).

Recommendations were developed for 6 different regions of California by groups of experienced local experts. WUCOLS was initiated in 1992, and revised in 1994, 1999, and 2014.

The University of California Landscape Plant Irrigation Trials (UCLPIT) evaluates plant material under deficit irrigation to develop irrigation recommendations. This analysis compared WUCOLS recommendations to UCLPIT field trial results.



The UCLPIT field in winter 2012.

**Table 1:** WUCOLS Categories of Water Needs for landscape plants

Category	Abbreviation	Percentage of ETo
High	H	70-90%
Moderate/Medium	M	40-60%
Low	L	10-30%
Very Low	VL	<10%

## Panel vs Trials: How do irrigation recommendations compare?

### Question #1

How do landscape irrigation recommendations developed by WUCOLS compare to UCLPIT results from the period 2014-2018?

**47.5% Agreement**

### Question #2

WUCOLS added ~1,500 taxa to the most recent version (WUCOLS IV, 2014), what is the level of agreement for plants patented, trademarked, or introduced since the previous version was published in 1999?

**44% Agreement**

### Question #3

While WUCOLS lists evaluations for 3,546 taxa, how well does WUCOLS cope with taxa patented, trademarked, or introduced after the 2014 publishing date?

**58.3% Agreement**

## Methods

During the period 2014-2018 UCLPIT generated irrigation recommendations for 82 taxa. Taxa were excluded from comparison if:

- a WUCOLS did not list a recommendation
- b WUCOLS listed water needs as “unknown”
- c WUCOLS listed water needs as VL, UCLPIT doesn’t have an equivalent treatment making such data incomparable

**Table 2:** The size of the initial datasets before cleaning, number of taxa excluded from analysis & reasoning for exclusion.

	Question 1	Question 2	Question 3
initial <i>n</i>	82	50	19
Excluded: Type A	15	12	5
Excluded: Type B	5	5	2
Excluded: Type C	1	-	-

Cleaned datasets were compared for percentage of agreement, with inter-rater reliability measured using Cohen’s kappa to assess if the level of agreement between two raters was due to chance. Cohen’s kappa measures agreement on a 1 to -1 scale, with 1 indicating strong agreement and 0 indicating agreement is likely due to chance. Cohen’s kappa was not measured for question 3 due to dataset size.

Agreement occurs when both UCLPIT and WUCOLS assign a taxa the same category of water need.

## Results

**Table 3:** The dataset size, percentage of agreement between WUCOLS and UCLPIT, and amount of inter-rater reliability.

	Question 1	Question 2	Question 3
<i>n</i>	61	50	12
Agree	29 (47.5%)	22 (44%)	7 (58.3%)
Disagree	32 (52.5)	28 (56%)	5 (41.6%)
Cohen’s kappa	0.163	0.138	-

## Discussion

For Questions 1 & 2, the low kappa scores between UCLPIT and WUCOLS, suggest agreement is more likely due to chance than intentional agreement. Further research with a larger dataset is needed to fully understand the reliability between experts and field trials.

Portions of each initial dataset, 25-36%, were excluded due to taxa being categorized as “unknown” or not listed in WUCOLS. For example *Lomandra* cvs. are becoming increasingly utilized in California landscapes. UCLPIT has evaluated 6 taxa from 3 species, *Lomandra* spp. *confertifolia*, *fluviatilis*, and *longifolia*, since 2014. WUCOLS categorizes *L. confertifolia*, and *longifolia* as “unknown” while *L. fluviatilis* is not listed. This can present a challenge to utilizing new taxa in landscapes.



*Lomandra longifolia* ‘Roma15’ Platinum Beauty™ & *L. fluviatilis* ‘AU807’ Shara™ (right) Photos: SK Reid

Issues arose when attempting to find taxa in WUCOLS for comparison to plants trialed by UCLPIT, such as *Ceanothus* ‘MATCEA01’. WUCOLS listed 3 comparable cultivars of *Ceanothus thyrsiflorus* var. *griseus*, each was assigned a different category of water need. C. ‘MATCEA01’ is an example of a new cultivar possessing different irrigation requirements than previous cultivars and demonstrates the value of scientific irrigation trials when determining new ornamental plant water needs.



*Ceanothus* ‘MATCEA01’ Highlights™ Photo: SK Reid