

Background

1. Water Conservation:

Over 65% of Utah's culinary water is used for landscape irrigation.

2. Water-Wise Landscape:

- Requiring little irrigation without affecting landscape quality.
- Using drought tolerant plants.

3. Buffaloberry (*Shepherdia ×utahensis*):

An ornamental plant developed for water-wise landscaping.



Figure 1. 'Torrey' hybrid buffaloberry plant in a water-wise landscape.

Objective

Determine the drought tolerance of buffaloberry.

Methods

1. Plant materials and treatments

- Plants were grown in an automated irrigation system controlled using a datalogger (Campbell Scientific, Logan, UT) (Fig. 2).
- Substrate water contents (θ) ranging from 0.05 to 0.40 $\text{m}^3 \cdot \text{m}^{-3}$ controlled using soil moisture sensors (10HS; Meter Group, Pullman, WA).

2. Measurements

- Total irrigation volume, substrate permittivity, plant tissue water potential, and transpiration rate were recorded.
- Leaf size, leaf curling index (Nilsen, 1983), and stomatal conductance were recorded. Root-shoot ratio was calculated using dry weight of roots and shoots.



Figure 2. The automated irrigation system (left) and 'Torrey' hybrid buffaloberry plants grown using this system (right).

Citation

Nilsen, E.T. 1987. Influence of water relations and temperature on leaf movements of *Rhododendron* Species. *Plant Physiology* 83:607-612.

Acknowledgements

USDA NIFA Hatch project UTA01381, New Faculty Start-Up Funds from the Office of Research and Graduate Studies, the Center for Water-Efficient Landscaping, and the Utah Agricultural Experiment Station at Utah State University.

Results

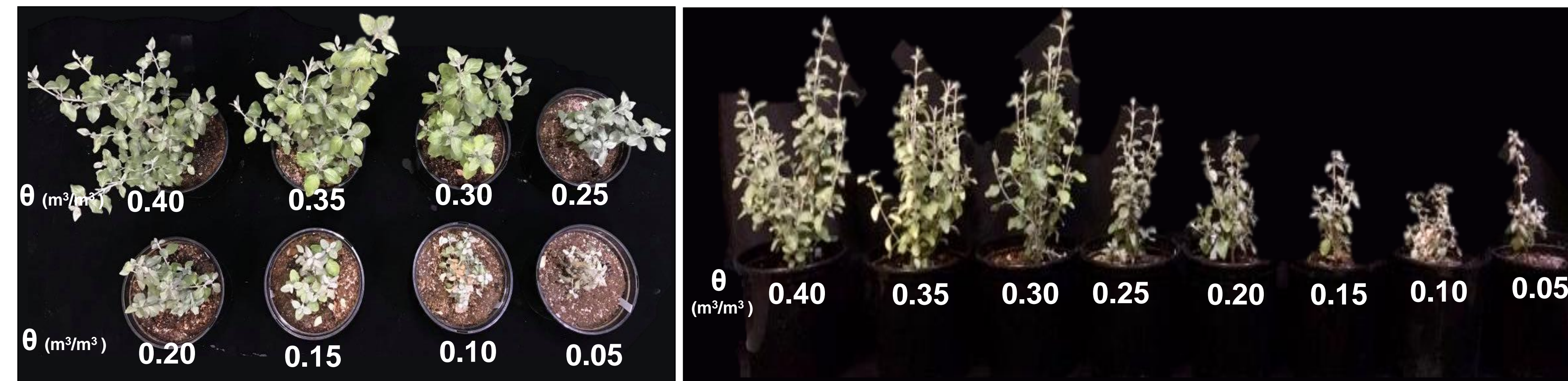


Figure 3. 'Torrey' hybrid buffaloberry grown in substrates at the substrate water content from 0.05 to 0.40 m^3/m^3 .

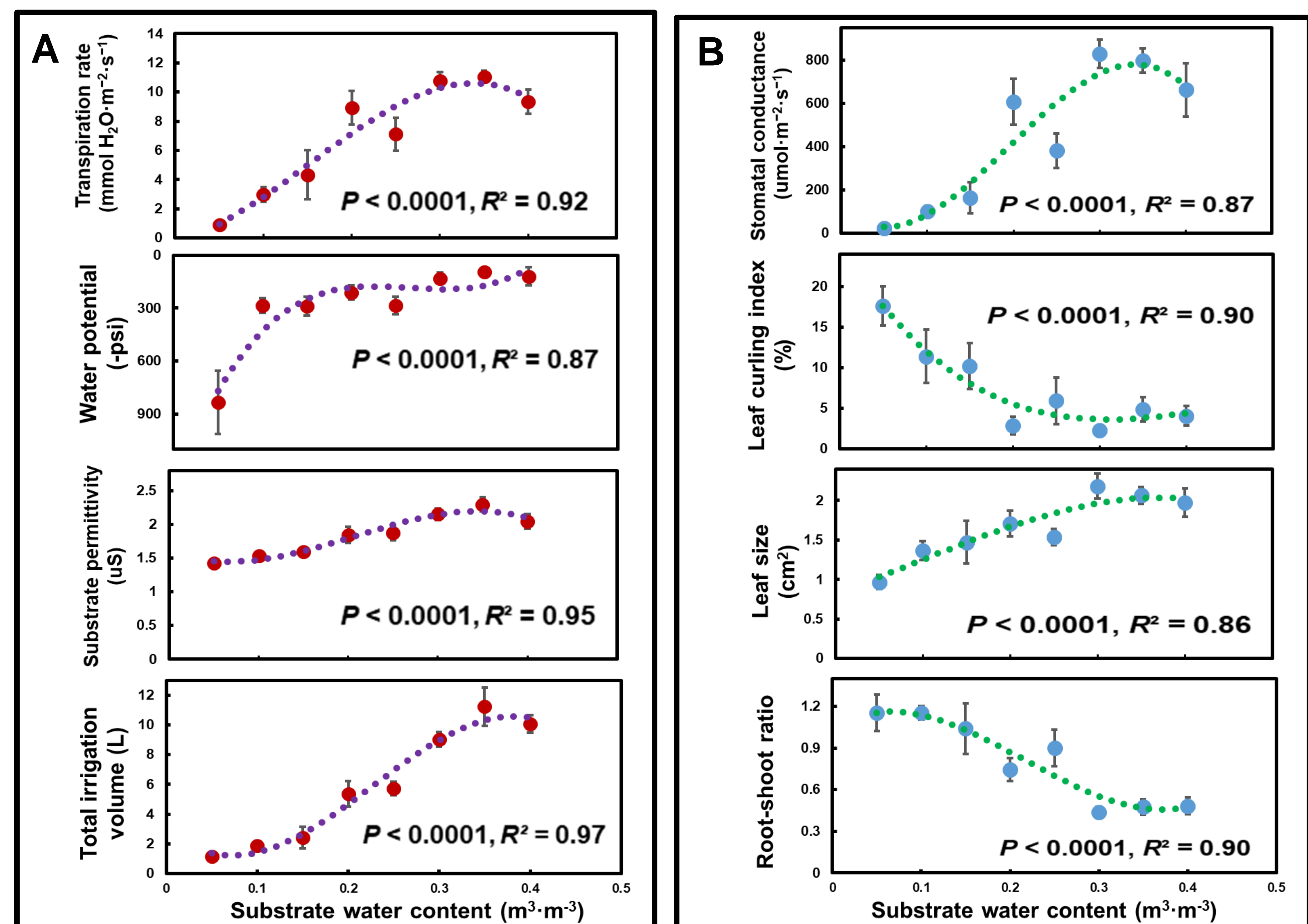


Figure 4. Plant and soil water status (A) and plant growth (B) of 'Torrey' hybrid buffaloberry at the substrate water contents from 0.05 to 0.40 m^3/m^3 .

Conclusions

- Plant growth was inhibited under drought stress (Fig. 3 and 4).
- The drought tolerance strategies of buffaloberry include:
 1. Increase root growth to obtain water (greater root-shoot ratio).
 2. Reduce radiation absorbance by changing leaf shape (greater leaf curling index).
 3. Limit water loss from transpiration (small leaves and lower stomatal conductance).