

Deficit irrigation from ebb and flow system effective for poinsettia

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As supplies of high-quality irrigation water become more limited, horticultural production operations are looking for alternative systems that can reduce water needs while ensuring healthy plants. A new study (*HortScience*, April 2016) of an "ebb and flow" subirrigation system, suggests that the method can be effective for controlling plant height and helping to alleviate salt stress in poinsettia, an ornamental known for its salt sensitivity.

Researchers used an ebb and flow irrigation system that was designed for potted ornamental plants; this efficient system can complete an ebb and flow cycle in only four minutes. According to corresponding author Martin Gent, this short cycle restricts water uptake and achieves partial saturation of the root medium, which is referred to as partial-saturation ebb and flow watering (PSEFW). "Partial-saturation subirrigation is a method of regulated deficit irrigation where the medium does not saturate during each irrigation event. Pots may take in 25% less water than those under full saturation," Gent explained. "The benefits of ebb and flow, as it is currently applied, are that no water is lost to the environment and very little is lost to evaporation," Gent said.

Gent and researchers Wade Elmer, Kranti Macherla, and Richard McAvoy performed two distinct experiments to determine whether regulated deficit irrigation in the ebb and flow system could alleviate the effects of salinity stress on poinsettia.

In this study, poinsettia cultivars Peterstar Red and Prestige Red were

grown at the University of Connecticut in Storrs, and cultivars DaVinci, Marble Star, Maren, Peterstar Red, Premium Picasso, Prestige Red, Ruby Frost, and Snowcap were grown at the Connecticut Agricultural Experiment Station in New Haven. Two cultivars were grown under partial- or full-saturation irrigation using a standard fertilizer solution, with or without the addition of $0.5 \text{ g}\cdot\text{L}^{-1}$ NaCl. Eight cultivars were grown in a second study with or without salinity of $1.2 \text{ g}\cdot\text{L}^{-1}$ NaCl under drip or ebb and [flow](#) watering.

"Our research showed that a background concentration of NaCl in the range of 0.5 to $1.2 \text{ g}\cdot\text{L}^{-1}$ had only a moderate effect on poinsettia growth, compared with the differences observed between cultivars, or the effects of irrigation management," the authors said. "The degree of medium saturation at each [irrigation](#) event had a more dramatic effect on overall plant size than did salinity, with greater [plant height](#) and fresh weight under full- than partial-saturation management."

The authors said the results demonstrated that partial saturation can be used as an effective water management option with poinsettia, and said the system has an added benefit of limiting toxic accumulation of Na in environments in which raw [water](#) contains elevated salinity.

More information: *HortScience*, hortsci.ashspublications.org/content/51/4/427.abstract

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