

# Significance to the Horticulture Industry

## Botrytis Treatment

**Influence of Essential Oils on Post-infection Botrytis Damage in Cut Roses.** Ben A. Bergmann and John M. Dole. *Journal of Environmental Horticulture* 36(2):45–57.

Minimizing Botrytis damage to cut flowers during storage and shipping is an ongoing industry challenge. Management practices during cut rose production attempt to eradicate the causal organism *Botrytis cinerea* Pers. ex. Fr., but even the most rigorous greenhouse protocols cannot ensure elimination of the ubiquitous pathogen. Thus, safe, inexpensive, reliable methods are needed to reduce damage in Botrytis-infected cut roses. This work shows that the promise of essential oil treatments to protect against fungal damage that has been demonstrated in various horticultural crops might be applicable to cut roses. Thyme essential oil was shown to reduce Botrytis damage in Botrytis-infected roses nearly to the extent that the most effective synthetic fungicide fludioxonil did. The flower phytotoxicity damage problem observed with aqueous essential oil treatments was reduced considerably by switching to vapor application. This work indicates that further research is warranted with thyme oil vapor with treatments centered between 4.6 and 9.1 ppm.

## Greenhouse Gas Emissions

**Greenhouse Gas Emissions from an Ornamental Crop as Impacted by Two Best Management Practices: Irrigation Delivery and Fertilizer Placement.** Anna-Marie Murphy, G. Brett Runion, Stephen A. Prior, H. Allen Torbert, Jeff L. Sibley and Charles H. Gilliam. *Journal of Environmental Horticulture* 36(2):58–65.

Agriculture is considered to be second only to energy production in greenhouse gas (GHG) emissions [carbon dioxide (CO<sub>2</sub>), nitrous oxide (N<sub>2</sub>O), and methane (CH<sub>4</sub>)]. While research to date has focused primarily on the evaluation of mainstream agricultural practices such as row crops, forestry, pastures and animal production systems, relatively little has explored mitigation strategies for specialty crop industries, such as container production. Protocols for establishing baseline estimates have been determined in previous work, though uncertainty still remains in determining specific best management practices for lowering GHG emissions in container production. In this work, the effects of two irrigation regimes (overhead vs drip) as well as two fertilizer placements (incorporated vs dibble) on GHG emissions were measured from Japanese boxwood (*Buxus microphylla*). Results showed that cumulative CO<sub>2</sub> emission over the duration of the nine month-long study was not affected by differences in irrigation or fertilizer placement. For plants receiving overhead irrigation, N<sub>2</sub>O emissions were greatest for those with incorporated fertilizer. However, total cumulative N<sub>2</sub>O efflux was least for drip-irrigated plants, regardless of fertilizer placement. Methane emissions were low throughout the study. Overall, results indicated that when attempting to mitigate GHG emissions from container-grown boxwood, utilizing drip irrigation could decrease N<sub>2</sub>O emissions regardless of fertilizer placement. When a grower is limited to overhead irrigation however, dibbling rather than incorporating fertilizer into the standard mix, may decrease overall N<sub>2</sub>O emissions.

## Growth Regulators

**Effects of Growing Season, Plant Stage of Development, and Substrate Drench Applications of Paclobutrazol as Compared**

**to a Daminozide Standard on Growth and Flowering of Gerbera Daisy ‘Bright Red with Light Eye’.** Y. Chen, J.R. Kessler, Jr, G.J. Keever, and G.B. Fain. *Journal of Environmental Horticulture* 36(2):66–72.

Gerbera daisy is a popular flowering pot plant commonly marketed in spring. However, plants grown under greenhouse conditions can grow too large for containers. Daminozide foliar spray is an industry standard practice for growth regulation in gerbera daisy production. Paclobutrazol was reported to be more effective and longer lasting than daminozide for many greenhouse crops, and may be more effective applied as a substrate drench than a foliar spray. In this study, ‘Bright Red with Light Eye’ gerbera daisy grown in 12.7 cm (5 in) pots were treated with 0, 1, 2, 3, or 4 ppm paclobutrazol substrate drenches or a 2,500 ppm daminozide foliar spray at two application stages for fall and spring finishing. Increasing paclobutrazol drench rates effectively controlled plant growth by decreasing foliage height, plant size index, and peduncle length, but delayed flowering, and decreased flower diameter and flower and bud counts. However, the deleterious effects of paclobutrazol were small and not considered of practical importance. Plants were larger in fall than spring. A 1 or 2 ppm paclobutrazol drench resulted in the highest consumer preference of gerbera daisy in fall, while in spring, 0, 1, 2, or 3 ppm paclobutrazol drench resulted in the same consumer preference. The industry standard practice of 2,500 ppm daminozide rate was too high for high consumer preference in this cultivar. Gerbera daisies were of excellent quality with a fall finishing and has potential in the floral market for the holiday season.

## Nonionic Surfactant

**Effects of a Nonionic Surfactant on Growth, Photosynthesis, and Transpiration of New Guinea Impatiens in the Greenhouse.** Jeff L. Sibley, Xiaomei Yang, Wenliang Lu, D. Joseph Eakes, Charles H. Gilliam, Wheeler G. Foshee, III, Jeremy M. Pickens and Bertram Zinner. *Journal of Environmental Horticulture* 36(2):73–81.

Adequate availability of high quality water for greenhouse plant production is an ever-present concern for growers. In a preliminary study, we first determined the daily amount of water required to grow a crop of New Guinea impatiens. Next, we conducted this study growing New Guinea with 40%, 60%, and 80% less water on a daily basis, with and without an additive of Tween 20 injected into the irrigation at various rates. This study is one of several (Beauchamp 2018, Greenwell 2017, Yang 2008) we have conducted demonstrating the same or increased growth for plants grown with less water when Tween 20 is added to the water supply compared with an ideal or deficit water supply. Results indicate that Tween 20 would make it possible to grow a crop with about half as much water as would be used when growing a crop with water alone.

## Weed Control

**Long-term Weed Control for Landscape Pecan (*Carya illinoensis*) Trees.** Lavesta C. Hand, Wheeler G. Foshee, III, Tyler A. Monday, and Jeff L. Sibley. *Journal of Environmental Horticulture* 36(2):82–84.

Landscape professionals often have to meet demands for weed-free areas around flowers, shrubs, and trees. In most landscapes, the area underneath ornamental and shade trees provide a less than ideal environment to sustain turf and also limits use of many groundcover plants. Areas underneath landscape tree canopies are generally dry,

shady, and filled with surface or shallow roots. Rather than the continuous struggle to maintain solid vegetation, landscapers use bark mulch or other aggregates to provide consistently aesthetically pleasing, weed-free areas. However, many escape weeds can be problematic in this setting. In addition, increased demand for edible landscapes from homeowners has made pecan trees a suitable landscape tree in many areas of the southeast. Long-term weed

control is needed to enhance the landscape while providing the best growing conditions to produce pecans. Indaziflam is an herbicide used extensively in pecan production that can assist in weed control in landscape systems. When used on mature pecan trees, indaziflam can provide an acceptable weed free-area for up to 120 days, which could potentially lead to less labor spent on hand weeding for landscaping crews.

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