

Significance to the Horticulture Industry

Air-blast Sprayer

Evaluating the Use of an Air-blast Sprayer with Variable-Rate Technology for High Coverage Trunk Applications in Multi-row Blocks of Field and Pot-in-Pot Nursery Production. Karl McKim, Lauren Fessler Mathews, Wesley C. Wright, Xiaocun Sun, Heping Zhu, and Amy Fulcher. *Journal of Environmental Horticulture* 43(3):173–187

In order to protect tree crops from trunk-boring insects such as flatheaded borers (*Chrysobothris* spp.), most nursery producers rely on either systemic insecticides applied to the root system or contact insecticides directly applied to trunks with an air-blast sprayer. Due to increasing concern about non-target effects of systemic insecticides, in particular to pollinators, we investigated the potential to use the laser-guided, variable-rate spray technology to thoroughly coat trunks in field and pot-in-pot nursery systems in a labor-efficient manner while also reducing waste, as has been possible when using variable-rate technology for foliar applications. We found that even when applying high volumes, 100% coverage could not be achieved with both new, variable-rate and conventional, constant-rate applications. More research is needed to substantiate the presumption that 100% coverage is necessary to achieve control of flatheaded borers and evaluate other sprayer types for the ability to provide thorough trunk coverage in a pesticide and labor-efficient manner.

Conifer Tolerance to Topramezone

Christmas Tree Tolerance and Weed Control with Post-emergence Topramezone. Jatinder S. Aulakh, Vipan Kumar, Ethan Paine, and Ritu Mohanpuria. *Journal of Environmental Horticulture* 43(3):138–143

Selective postemergence (POST) herbicide choices for controlling broadleaf weeds in Christmas tree plantations are limited. Topramezone is registered as a preemergence (PRE) application in dormant Christmas trees before budbreak or a POST-directed application in actively growing Christmas trees. Currently, topramezone label lists a few species of fir, pine, and spruce as tolerant ornamental trees. Results from this study show that topramezone at the labelled rate (98 g ai-ha⁻¹ or 0.09 lb ai-A⁻¹) did not cause injury to balsam fir, canaan fir, Colorado blue spruce, Douglas fir, Fraser fir, Nordman fir, Norway spruce, white pine, and a Fraser × balsam hybrid. Furthermore, the labelled rate of topramezone was very effective in controlling common ragweed, horseweed, fall panicum, and large crabgrass. For yellow foxtail, sequential topramezone applications at 98 g ai-ha⁻¹ (0.09 lb ai-A⁻¹) may be required for satisfactory control. Above all, topramezone adds a new mode-of-action, a p-hydroxyphenylpyruvate dioxygenase (HPPD)-inhibitor, to supplement the POST broadleaf and grassy weed management options for Christmas tree growers.

Pycnanthemum Growth Regulation

The Effects of Paclobutrazol on the Vegetative and Reproductive Traits of *Pycnanthemum*. Kaitlin Swiantek and John Ruter. *Journal of Environmental Horticulture* 43(3):144–151

Plant growth regulators (PGR) are compounds that influence plant growth and development through means other than supplying nutrients (Rademacher 2015). Plant growth, such as flowering and height, can be altered by manipulating temperature and light (Moe and Heins 1990). However, less specialized equipment is required when applying a PGR compared to controlling environmental factors. Additionally, PGR applications demand less labor than physical methods of controlling plant growth, such as pruning. Production efficiency in the greenhouse and field is integral to the success of new plants. New plant introductions are exciting to consumers but can be daunting to growers if no information exists regarding cultivation. Introducing production information and best practices for growing plants makes new genera accessible for cultivation by growers. Using PGR to improve commercial production has been achieved in various ornamental plants. However, little production information is available for *Pycnanthemum*. Determining optimal PGR treatments for the new genus removes a major limit to production and encourages the introduction of the new genus in the ornamental market.

Potential Invasiveness

Development and evaluation of landscape plant cultivars with reduced fertility to minimize potential invasiveness. Ryan N. Contreras, Thomas G. Ranney, Sandra B. Wilson, John Lambrinos, Nathan P. Lynch, Acer VanWallendael, Richard T. Olsen, Mark Brand, Neil O. Anderson, and John M. Ruter. *Journal of Environmental Horticulture* 43(3):152–166

Plant breeders continue to work on developing low fertility, seedless, non-invasive cultivars of selected taxa to minimize self-sowing and establishment of potentially weedy but valuable cultivars. Other benefits of these approaches can include enhanced flowering and reblooming, reduced fruit litter, and reduced pollen allergens. However, specific questions often arise in this process, including: 1) what approaches can be used to develop low fertility cultivars, 2) how is reproductive fertility best evaluated for stability of expression over years and locations, 3) what level(s) of infertility are sufficient, and 4) how should policy and regulation accommodate these cultivars? This report reviews approaches for developing and evaluating low-fertility landscape cultivars to minimize self-sowing, weediness, range expansion, and potential invasiveness with recommended approaches, guidelines, and policy.

Rice Hull Mulch

Impact of Rice Hull Mulch Depth on Emergence of Multiple Weed Species at Varying Growth Stages in Nursery Containers. Yuvraj Khamare, Heather Kalamian, and Chris Marble. *Journal of Environmental Horticulture* 43(3):167–172

Weed control is a major cost and management concern in container nursery production. While preemergence herbicides are commonly used, options are limited, particularly for sensitive ornamental cultivars. In addition, more than 80% of broadcast-applied herbicide often misses the target containers, reducing efficacy and increasing waste. As a result, many growers have adopted parboiled rice hull mulch as a sustainable alternative. Rice hulls are lightweight, easy to apply, and hydrophobic, characteristics that make them ideal for use in

container production. However, in nursery production there is often a 2–3-week gap between potting and mulch application, during which weed seedlings can become established. This study addressed a key industry question: Can rice hull mulch still suppress weeds if seedlings are already present at the time of application? The results demonstrated that mulch applied at depths of 1.3, 2.5, or 5 cm significantly reduced the growth of common container weeds, even when seedlings had already emerged. The greatest suppression occurred at depths of 2.5 and 5 cm, regardless of weed growth stage. Growers can apply rice hull mulch up to 2–3 weeks after potting and still achieve effective weed control, provided the mulch is applied at a minimum depth of 2.5 cm. These findings support the use of rice hulls as a cost-effective and sustainable weed management tool in container nursery production.

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Horticultural Research Institute
2130 Stella Court, Columbus, OH 43215
p. 614-487-1117 | f. 614-487-1216 | hriresearch.org

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