# Significance to the Horticulture Industry

## Adventitious Root Formation

**Histology of Adventitious Root Formation in Four Woody Species and Effect of a Synthetic Auxin. Xinya Lu, Ashton Pluchinsky, Avery Herren, Rajib Islam, Daniel C. Whitehead, and Haiying Liang.** *Journal of Environmental Horticulture 43(2):91–102*

Plant propagation is a vital part of the agricultural, forestry, and horticultural industries. Among the many forms of plant propagation, cuttings remain preferred for many species due to their simplicity and the ability to maintain desirable genetic traits. Although adventitious root formation in cuttings is a prerequisite step in clonal propagation, the process is not well understood, particularly in trees. Furthermore, some economically important plant species, including those used in horticulture, ornamentals, forestry, or medicine, are recalcitrant to rooting. Our study provides new insights into adventitious root induction, which could benefit other recalcitrant woody species. The impact is of great significance in the propagation of elite genotypes for nurseries, research, and conservation.

## Boxwood Blight

**The Effects of Sanitizers on *Calonectria pseudonaviculata* and *C. henricotiae* Conidia and Microsclerotia Viability. J. A. LaMondia, R. S. Cowles, and Nina Shishkoff.** *Journal of Environmental Horticulture 43(2):83–90*

Boxwood (*Buxus* sp.) is a popular ornamental used in historic and home landscapes as hedges, specimen plants and topiary, while cut greenery is sold as wreaths. Despite the current threat posed by boxwood blight disease, which first appeared in the U.S. in 2011, boxwood's popularity continues to grow. Annual sales of boxwood in the U.S. before the introduction of the pathogen (in 2009) were $102.9 million; in 2014, when boxwood blight was reported from 18 states, they were approximately $126 million (Hall et al. 2021) and were part of the $46 million dollars in sales for cut greenery in 2015 (USDA National Agricultural Statistics Service 2017). In 2019, when boxwood blight was reported from 30 states (Daughtrey 2019), boxwood sales were $140.9 million but the top boxwood-growing states have shifted as the pathogen has spread (Hall et al. 2021). To ensure that boxwood continues to be a mainstay of landscapes, methods need to be developed to ensure that spread of the boxwood blight pathogen can be minimized.

## Crapemyrtle Bark Scale

**Feeding Behavior Analyses Reveal Nicotine Selectively Inhibits Sap Ingestion in Crapemyrtle Bark Scale (*Acanthococcus lagerstroemiae*), an Invasive Insect in the U.S. Bin Wu and Hongmin Qin.** *Journal of Environmental Horticulture 43(2):56–66*

The horticulture industry predominantly relies on neonicotinoids, compounds akin to nicotine, to control crapemyrtle bark scale, a relatively new invasive insect pest spreading across 20 U.S. states and threatening the health and marketability of a wide range of economically and ecologically important plants. Prior to our study, the specific effects of these insecticides on feeding behavior of this insect were not well understood, a crucial gap in knowledge for refining insecticide application. In this study, we utilized an agarose-based artificial diet supplemented with different concentrations of pectin and nicotine to explore its impact on CMBS. Through detailed analyses involving enzyme detection via ruthenium red staining and feeding behavior investigation via EPG techniques, we found that while nicotine does not have a notably negative impact on CMBS salivation, it inhibits sap ingestion at the tested concentrations. This selective inhibition of nutrient uptake indicates that nicotine acts as a neurotoxin, disrupting specific neural pathways related to sap ingestion in CMBS, without affecting other essential feeding processes. The methodologies and findings from this study will inform future research into the nuanced effects of neonicotinoids at both sublethal and lethal concentrations, aiding in the development of more precise and sustainable management practices for CMBS within the horticulture industry.

## Light Durations

**A Comparative Study Analyzing Light Durations for the Growth of 'Rex Butterhead' Lettuce Lactuca sativa Utilizing GREENBOX Technology. Mya Alexandria Catherine Griffith, George Paul Buss, Paige Ann Carroll, John L. Griffis, Galen Papkov, Xiusheng Yang, Sarah Bauer, and Ankit Kumar Singh.** *Journal of Environmental Horticulture 43(2):74–82*

With the rising pressures on food security, GREENBOX technology was developed as an avenue for fresh leafy vegetable crop production in urban settings. Urbanization continues to challenge the horticulture industry to provide innovative solutions to combat food insecurity and instances of food deserts. GREENBOX technology utilizes CEA coupled with hydroponics as an avenue for sustainable crop production. This provides many benefits to the horticultural industry, including higher quality, consistency, and yield of crops while also reducing the resources required compared to soil-based food production, resulting in a net increase in crop production rates. It also reduces the need for pesticides and increases the marketability for fresh, clean, nutritious produce. As light is a very significant factor in the production of nutritious leafy greens such as 'Rex Butterhead' lettuce (*Latuca sativa* L.), it can be altered in spectra, intensity, and duration to enhance crop productivity and nutritional value. Although artificial lighting may be the most effective resource in CEA, it is also the most unsustainable due to high energy usage and associated cost. Finding a suitable photoperiod that can reduce the energy consumption of GREENBOX technology without compromising the quality of crops can offer the horticulture industry a reliable, year-round opportunity for sustainable crop cultivation in urban areas.

## Mouse Ear Disorder

**Supplemental Nickel Corrects Mouse Ear Disorder of American and Interspecific Hybrid Hazelnuts. Alyssa M. Headley, Carl J. Rosen, Stan C. Hokanson, John M. Ruter, and Brandon M. Miller.** *Journal of Environmental Horticulture 43(2):67–73*

Hybrid hazelnuts [*C. americana* (Walter) × *C. avellana* (L.)] combine the cold hardiness and disease resistance traits of the locally native American hazelnut with the kernel size and thin shells of the globally popular European hazelnut. Sought after for healthful nuts with immense potential as an oilseed crop, this re-envisioned filbert and improved selections of American hazelnut comprise an emerging specialty crop in the Upper Midwest (Braun and Wyse 2019). However, hybrid and American hazelnuts remain underutilized due to plant-production pipeline bottlenecks like purported susceptibility to Mouse Ear Disorder (MED). Reports from nursery growers of deformed leaf development of container-grown stock strongly align with symptoms of MED reported for other members of the Betulaceae family (Ruter 2005) and suggest hazelnuts, like some other ureide transporting woody plants, may require supplemental nickel when cultivated with soilless substrates. However, hazelnuts have not previously been evaluated for susceptibility to this unusual deficiency and protocols for best practices are non-existent. The data presented reinforces that hazelnuts are susceptible to MED when cultivated in nursery containers with soilless substrates and that symptoms of MED on hazelnuts can be corrected by supplementing plants with either Nickel Plus®, $NiCl_2$, or combined $NiCl_2$ and urea treatments, but not urea alone. The results of this study serve as a resource for improving the production of hybrid and American hazelnuts in the nursery and may support further development of this emerging crop.

## Vascular Streak Dieback Meeting Proceedings

**Planning a Solution: A Partnership to Identify Research and Extension Priorities for Vascular Streak Dieback (VSD) in Woody Ornamental Crops. Tennessee State University, Otis L. Floyd Nursery Research Center, McMinnville, TN. October 1-2, 2024. Sponsored by USDA-NIFA Specialty Crops Research Initiative (Award No. 2024-51181-43200). Meeting hosted by Tennessee State University College of Agriculture. Published by the Horticultural Research Institute, The AmericanHort Foundation.** *Journal of Environmental Horticulture 43(2):103–137*

Main Objective: To develop a comprehensive research and extension plan for nursery crops that addresses stakeholder needs for improved, cost-effective, and sustainable vascular streak dieback management. Goals: 1) Identify priorities and critical needs, 2) Identify knowledge gaps, and 3) Determine how to address priorities, critical needs, and knowledge gaps.





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