Significance to the Horticulture Industry

American Floriculture Industry

Shifts in the American Floriculture Industry: Insight from Industry Experts. Ethan B. Jenkins, Melinda J. Knuth, Charlie R. Hall, and Marco A. Palma. *Journal of Environmental Horticulture 41(4):*133–140

The U.S. floral industry is constantly shifting due to several factors that are involved in nearly every aspect of an industry that sells a living product. In order to determine these factors, over forty leaders from different sectors within the industry were interviewed in order to gain expert insight into which factors are directing these shifts. Utilizing the participants' responses, Leximancer software was used to conduct a quantitative content analysis using a machine learning technique. Through our analyses, we pinpointed many of the same recurring responses from the participants regarding structural shifts in the industry, omnichannel development, and key future success factors. Implications are discussed.

Biochar and Container Media

Influence of Biochar Addition to Nursery Container Media: Trace Gas Efflux, Growth, and Leachate N. Stephen A. Prior, G. Brett Runion, Anna-Marie Murphy, Heath Hoffman, Mark G. Johnson, and H. Allen Torbert. *Journal of Environmental Horticulture 41(4):*141–151

Biochar is a pyrolytic product generated by heating biomass in the absence of oxygen such as during bioenergy production. Biochar can be made from various feedstocks and research into its potential use in agricultural systems has examined its effects on plant growth, trace gas emissions, and N loss. However, since a paucity of work has examined biochar use in horticultural container production systems, we investigated how biochar additions to growth media impacted trace gas efflux (CO_2, CH_4, and N_2O), plant growth, and N loss via leachate in two separate experiments: a peat-based greenhouse study using viola (*Viola cornuta* L. 'Sorbet® XP Deep Orange') and a pinebark-based outdoor study using daylily (*Hemerocallis* x 'EveryDaylily Cream PBR' L.). Biochar had little effect on viola growth, but growth inhibition was noted for daylily. Both studies clearly showed that N in leachate was reduced by biochar additions, with higher biochar rates having greater effects on reducing N loss. Reductions in N loss with biochar suggest improved N use efficiencies in agricultural systems. Biochar use also decreased N_2O and CO_2 fluxes in daylily, which suggests that biochar could help mitigate global climate change. Our results suggest that future studies should focus on testing lower rates of biochar in terms of growth and environmental impacts. The complexities of N management highlight the importance of developing biochar practices that increase N retention for the benefit of both agriculture and the environment.

Plant Benefit Perceptions

Plant Benefit Perceptions Influence Consumers' Likelihood to Buy and Differs across Age Cohorts. Alicia L. Rihn and Bridget K. Behe. *Journal of Environmental Horticulture 41(4):*152–160

Plants provide many benefits (e.g., social, physiological, emotional, mental) but some consumers may be unaware of those benefits. Here, we investigate the effects of social, physiological, and emotional and mental health benefits of plants on consumers' likelihood to buy (LTB) a plant based on those messages. A sample of 497 Americans participated in an online survey in 2021. All three plant benefit messages increased consumers' LTB a plant, but differences were observed among age cohorts. Compared to the oldest age cohort (consumers born before 1965), Generation Z (born after 1996) responded most positively to the emotional and mental health benefit message followed by the physiological benefit, but did not respond to the social benefit. Compared to the older cohort, Millennials (persons born between 1981–1996) responded more favorably to all three benefit messages. Generation X (people born between 1965–1980) responded favorably to the emotional and mental health benefit message followed by the social benefit but not the physiological benefit. Generally, as education level and income increased, effects of the plant benefit messages decreased. Respondents who made plant purchases online responded favorably to the emotional and mental health plant benefits. Individuals who did not buy any plants did not respond favorably to any of the plant benefit messages. Plant sellers should employ benefit messages tailored to the age cohort target market(s) for the greatest impact.

Redheaded Flea Beetle

Effects of Insecticide Drench Application against Immatures of *Systena frontalis* in Container-grown *Hydrangea paniculate*. Shimat V. Joseph and Alejandro I. Del Pozo-Valdivia. *Journal of Environmental Horticulture 41(4):*161–169

Systena frontalis (F.) (Coleoptera: Chrysomelidae), commonly referred to as the redheaded flea beetle, is a serious pest in container nurseries, as adult feeding defoliates nursery crops and affects plant salability. Because the foliar application of insecticides provides inconsistent efficacy, additional and alternative control tactics are sought to target immatures of this pest in growing media. Thus, the objective was to determine the effects of non-neonicotinoid insecticides applied as a drench to growing media on immatures of *S. frontalis*. In 2021 and 2022, nine active ingredients were evaluated in four trials in a Georgia nursery and at a Virginia research and extension center. If available, the maximum label rates for flea beetles or other coleopteran pests were applied once to *Hydrangea paniculata* Siebold containers (11.4 L, 3 gal) as a drench application. The emergence of *S. frontalis* adults from treated growing media and foliar feeding damage was lower for the tetraniliprole (Tetrino™) and spinetoram + sulfoxaflor (XXpire®) treatments than for nontreated plants. Cyclaniliprole (Sarisa™) and chlorantraniliprole (Acelepryn®) suppressed *S. frontalis* adult eclosion with less feeding damage than the nontreated plants. Tetraniliprole, spinetoram + sulfoxaflor, and cyclaniliprole are not labeled for drench application. Dinotefuran (Safari®) effectively reduced adult emergence and feeding damage.

Transparent Photovoltaic Panels

Growth of Snapdragon Under Simulated Transparent Photovoltaic Panels for Greenhouse Applications. Eric J. Stallknecht, Christopher K. Herrera, Thomas D. Sharkey, Richard R. Lunt, and Erik S. Runkle. *Journal of Environmental Horticulture 41(4):*170–179

Transparent photovoltaic (PV) materials can be used as greenhouse coverings that selectively transmit photosynthetically active

radiation (PAR). Despite the economic importance of the floriculture industry, research on floriculture crops has been limited in these dual-purpose, agrivoltaic greenhouses. We grew snapdragon under simulated photoselective and neutral-density panels with transmissions ranging from ~30 to 90%, and absorption edges in the green (G; 500–599 nm), red (R; 600–699 nm), far-red (FR, 700–750 nm), and near-infrared (NIR) wavebands. We hypothesized that snapdragon could tolerate some degree of PV shading without reducing growth and flower number or delaying flowering time. Biomass accumulation, compactness, time to flower, and crop quality under 1) a clear acrylic control, 2) a FR-absorbing, and 3) a NIR-absorbing PV panel were not statistically different when the average daily light integral was between 17 and 20 $mol \cdot m^{-2} \cdot d^{-1}$. Crop quality progressively diminished below 17 $mol \cdot m^{-2} \cdot d^{-1}$. These results indicate that snapdragon tolerated ~15% PV shading during summer months without reduced growth or quality.