From Forest Nursery Notes, Summer 2009

192. Use of switchgrass as the primary potting component in nursery containers. (ABSTRACT). Altland, J. and Frantz, J. HortScience 44(4):1130. 2009.

Specified Source(s) of Funding: MSU Project GREEEN, MDA Horticulture Fund, Spring Meadow Nursery, Inc., Renewed Earth, Inc., Harrell's, Inc.

(196) Development of a Double Crop Production System Using Retractable Roof Houses

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Double cropping containerized tree liners in a retractable roof greenhouse (RRG) increases the incentive for their production in Midwest nurseries. The objectives of this study are to evaluate possible acceleration of tree production using double cropping in a RRG at The Ohio State University, Columbus, Ohio with subsequent upshifting to a pot-in-pot (PIP) system. Two tree species were selected to be grown in the RRG, Red Maple (*Acer rubrum* October Glory®) and Littleleaf Linden (*Tilia cordata* Greenspire®). All the trees were grown from tissue culture and they had a start height of 20-25 cm. All the plants were put into 11.3 L containers with a soilless mix in the RRG. The roof and sidewalls were programmed to close at 21 °C during the day and 10 °C during the night from October to December and plants were irrigated using aerial irrigation 3 times/day. From December to March half of the plants were with bottom heat (BH) using low watt propagation mats set at 5 °C and the other at ambient temperature (AT). During winter, plants were watered as needed and protected from freezing temperatures using a propane heater. From March to June the irrigation was applied using cyclic-micro-irrigation two times/day, applying 500 ml/pot. From June to September, irrigation was applied one time/day, applying 250 ml of water/pot. Plants were fertilized two ways starting in April: control release (CR) fertilizer (40g of 19-5-8) applied at potting and a combination of 20g of the CR applied at potting and supplemented with liquid fertilizer (LF) (21-7-7 at 400 ppm) delivered with an injection system every two weeks. The same total nitrogen was delivered in the CR and the CR + LF treatments. Plants were arranged in a split plot design (main plot–temperature, subplot–fertilizer) with 4 replications. Measures consisted of height, caliper, leaf area, and shoot and root dry weights, EC, pH and NO_3. No significance differences were found between AT and BH for all the measurements. No significance differences were found between the CR and CR+LF treatments for height, leaf area, dry shoot and root weights, EC, pH and NO_3. The caliper was significantly bigger (8.48mm) in the CR+LF in comparison with the CR (7.82mm). After one year, heights and calipers of linden (107cm and 8.61mm, respectively) and maple (95.39 cm and 7.76mm, respectively) liners were produced at OSU, supporting our hypothesis that RRG liners can be produced in Ohio.

(197) Influence of Accelerator™ Containers and MicroKote™ on Growth and Water Loss of Container-Grown 'Recurvifolium' *Ligustrum*

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A study was conducted to determine the influence of container design (Accelerator™ and black plastic containers) and MicroKote™ on the growth, nutrient uptake, and water loss from container-grown *Ligustrum japonicum* Thunb. 'Recurvifolium'. Concern has been expressed by growers that plants produced in Accelerator™ containers dry out too fast and weeds grow from the openings on the sides of the container. MicroKote™ is a new micronutrient supplement that is painted on the inside wall of the container and contains Ca, Mg, Cu, Fe, Mn, and Zn. Plants were grown outdoors in full sun from May to Oct., 2008 on woven nursery groundcloth with a spacing of 90 cm on center. The substrate was an 8:1 blend of pine bark to sand with standard amendments. Plants were irrigated three times per day at 400 mL of water per irrigation using spray stakes so that water was not limiting. Treatments included a factorial combination of Accelerator™ containers (10.9 L) and standard black plastic squat containers (10.1 L) treated or not treated with MicroKote™. Container design had no influence on plant growth or final foliar nutrient concentrations. In July, water loss from plants growing in Accelerator™ containers was 69% greater than for plants in black plastic containers. Evaporation accounted for 65% for the water lost from Accelerator™ containers, compared to 35% for standard plastic containers. There was no difference in transpiration between types of containers in July. In September, total water loss was 23% greater for Accelerator™ containers compared to standard containers. Evaporation accounted for 53% of total water loss for the Accelerator™ containers compared to 22% for the standard containers. Transpiration accounted for 78% of water lost from standard containers in September compared to 47% for the Accelerator™ containers. Mean and maximum root zone temperatures from May to October were 27.8 °C and 45.0 °C for the Accelerator™ and 29.7 °C and 49.4 °C for the standard container, respectively. MicroKote™ had no influence on plant growth or final nutrient concentrations in the foliage. Weeds growing from holes in the sides of the Accelerator™ containers were not a problem in this study, though the author has seen problems in commercial nurseries. Under conditions of non-limiting water, plants grew just as well in both types of containers. Further work is warranted under conditions of limiting water during nursery production.

Specified Source(s) of Funding: Industry

(198) Use of Switchgrass as the Primary Potting Component In Nursery Containers

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Pine bark is the primary potting component for nursery containers in Ohio and other Upper Midwest states. Most pine bark comes from lumber or paper mills in southern states. Due to the recent energy crisis, availability of pine bark has declined while the cost to import pine bark from southern states has risen dramatically. The objective of this research was to determine if locally grown switchgrass (*Panicum virgatum*) could be harvested and used as an alternative to pine bark in nursery containers. Switchgrass was processed through a hammermill with a 2.5 cm screen prior to use. Switchgrass was blended with either 0%, 30%, or 50% sphagnum peat moss by volume. Roses (*Rosa* 'ChewMayTime') from 5.7 cm wide cells were potted into 15 cm tall and wide plastic containers with one of the three substrates. Switchgrass with 0% peat moss had low water holding capacity (36%) compared to that amended with 30% or 50% (45% and 53%, respectively). Substrate pH of switchgrass with 0% peat moss was 6 or greater throughout the experiment. Amendment with peat moss at 30% or 50% reduced pH to between 4.0 and 4.5 throughout the experiment. Despite differences in substrate physical properties and pH, substrate type caused no differences in root or shoot growth over the course of the experiment (8 weeks).

(199) Differential Effects of Controlled Release Fertilizer Rates of Growth and Leaf Nutrient Concentrations of Containerized Shade Tree Species

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