

# Abstracts of the ASHS Southern Region

## 69th Annual Meeting

Atlanta, Georgia

31 January–2 February 2009

### J.B. Edmond Undergraduate Student Paper Competition

#### Amending Pine Bark Supplies with *WholeTree* and Clean Chip Residual

Anna-Marie Murphy<sup>1</sup>, Charles H. Gilliam<sup>1</sup>, Glenn B. Fain<sup>1</sup>, H. Allen Torbert<sup>2</sup>, Thomas V. Gallagher<sup>3</sup>, Jeff L. Sibley<sup>1</sup>, and Stephen C. Marble<sup>1</sup>, <sup>1</sup>Auburn University, Department of Horticulture, Auburn University, AL 36849; <sup>2</sup>USDA-ARS, National Soil Dynamics Laboratory, Auburn, AL 36832; <sup>3</sup>Auburn University, School of Forestry and Wildlife Sciences, Auburn University, AL 36849

This study evaluated the growth of five container-grown crops in nine different substrates with varying ratios of Pine Bark (PB), Clean Chip Residual (CCR) and *WholeTree* substrate (WT) in each. Treatments consisted of 100% each of PB, WT, and CCR, and 75:25 PB:CCR and PB:WT, 50:50 PB:CCR and PB:WT, and 25:75 PB:CCR and PB:WT. CCR and WT used in this study were processed through a swinging hammer mill to pass through a 0.95 cm (3/8 inch) screen. pH and electrical conductivity (EC) levels were measured using the pour through method at 7, 15, 30, 60, and 90 days after transplanting (DAT). At 30 DAT, pH of 100% PB (5.68) climbed with increasing levels of WT to 6.57 in 100% WT. Increasing volumes of CCR at 60 DAT exhibited the same trend with pH climbing from 6.26 (100% PB) to 6.59 (100% CCR). Addition of CCR and WT tended to raise pH at all testing dates, although levels did not exceed the recommended range, possibly indicating that lime may not be needed with higher levels of CCR and WT. EC levels were high at 7 DAT, but began to stabilize around 30 DAT, although 75:25 PB:CCR tended to maintain the highest levels throughout the study (1.60 dS/m at 7 DAT to 0.72 dS/m at 60 DAT). Growth indices [(height + width1 + width2)/3] (cm) were measured at 90 DAT. There were no statistical differences in growth indices of azalea in any substrate. For spiraea and ligustrum, all treatments had growth indices that were either statistically the same or larger than 100% PB. Tea olive, however, tended to grow better in substrates with 50% PB or higher, as the 25:75 PB:CCR treatment was the only treatment to have growth indices statistically smaller than those of the 100% PB treatment. Overall, this study demonstrated that nursery producers could amend their PB supplies with up to 75% WT or CCR with limited to no impact on crop growth.

#### Can Honey Be Used as an Auxin Substitute for Rooting Cuttings?

Erin E. Melville\*, Weiguang Yi, and Hazel Y. Wetzstein, Department of Horticulture, 1111 Miller Plant Science Building, The University of Georgia, Athens, GA 30602-7273

Synthetic auxins such as IBA and NAA are commonly applied to promote adventitious rooting in vegetative propagation protocols. However, health hazards are associated with their use including skin, eye and lung irritation, and mutagenesis with chronic exposure. With a growing interest in the use of organic, sustainable, and green products, the identification of a naturally-derived substitute for synthetic auxins is desirable. Honey has growth promoting and nutritional components, and has been implicated as possessing root promoting activities. The objectives of this study were to evaluate the effects of honey on adventitious rooting in chrysanthemum and to determine if honey can act as an alternative to synthetic auxins. The basal 1.5 cm of 'White Blush' Chrysanthemum cuttings were given a quick dip in either honey (100%, 50%, 25%, or 3%), 1500 ppm

KIBA, or water. Percentage rooting, root number, root length, and shoot height were destructively assessed at 1 and 2 weeks; root and shoot dry weights were taken at 2 weeks. Percent rooting was rapid with >80% rooting obtained in all treatments by 1 week except for the 100% honey treatment which had a significantly lower rooting percentage, i.e., 60%. At week 2, all treatments had 100% rooting; no statistical differences in rooting percentage, number or weight were observed between KIBA, water, or honey treatments suggesting that KIBA may not be necessary for rooting in this species. However, differences in shoot dry weight were observed. All honey treatments produced plants with greater shoot dry weights and higher shoot:root ratios, indicating that honey promoted shoot and leaf growth.

#### Interesting Edibles: Designing an Edible Ornamental Garden for the Cliffs Botanical Garden

Tina Musco\*, Renee K. Byrd, and Mary Taylor Hague, Department of Horticulture, Clemson University, Clemson, SC 29634

Clemson University horticulture faculty and students have been working with the Cliffs Communities, a development company with private residential golf course communities in the Carolinas, to design a botanical garden for the Cliffs at Mountain Park in Travelers Rest, SC. The garden will be open to the public as a place of recreation and education for the surrounding community. Following a design methodology including research, analysis, preliminary, and final design development, a class of 10 students collaborated to research information pertaining to existing potage gardens, site analysis, photo analysis, program development, sustainable practices, and base mapping. Students then worked individually to design selected theme gardens and develop master plans. The master plans, including plant lists, pricing, quantities, planting details, and elevation drawings were presented to a board of Cliffs Community employees. The focus of this presentation will be an "Edible Ornamental Garden" which will showcase plants whose fruits, leaves, or roots are edible. Sustainable concepts have been incorporated such as native plant usage, companion planting, crop rotations, green roofs, pervious paving, and recycling material from development construction. The "Edible Ornamental Garden" has been subdivided into four different areas featuring 1) "Edibles Gone Wild," 2) "The South Carolina Garden," 3) "The Chef's Garden," and 4) "The Beverage Garden." Each area will emphasize plants with showy blooms, delicious fruits, attractive foliage, and interesting forms along with interpretative signage. The Edible Ornamental Garden will reinforce the "from farm to table" connection and educate the public on the benefits of locally grown produce.

### Norman F. Childers MS Graduate Student Paper Competition

#### Changes in Edible Quality and Aroma Profile of 'Arkin' Carambola During Ripening on the Tree

Oren Warren<sup>1</sup>, Steven Sargent<sup>1</sup>, Donald Huber<sup>1</sup>, Jeffrey Brecht<sup>1</sup>, Anne Plotto<sup>2</sup>, and Elizabeth Baldwin<sup>2</sup>, <sup>1</sup>Horticultural Sciences Department, University of Florida, Gainesville, FL 32611; <sup>2</sup>USDA-ARS Citrus and Subtropical Products Laboratory, Winter Haven, FL 33881

Commercially produced 'Arkin' carambola was harvested at five ripeness stages (1/4 yellow, 1/2 yellow, 3/4 yellow, 1/4 orange, and 1/2

Oklahoma. Vine damage, vine death, and manifestation of crown gall were common consequences of the event. Victory Vineyards in Quinton, Okla. was the site of an experiment to determine if crop removal in 2<sup>nd</sup> leaf vines affected yield and growth of vines in the 3<sup>rd</sup> leaf and beyond on 'Cabernet Sauvignon' vines. Four treatments were implemented, flower removal before bloom (T1), early cluster removal (T2), cluster removal at veraison (T3), and no removal (T5). The 2007 freeze altered the experiment because of the damage to vines; however, crown gall expression was found to be related to the number of clusters on the vine after the freeze event. Vines with no crown gall expression averaged 6.4 clusters per vine, which was significantly different from vines with crown gall that averaged 11.0 clusters per vine. Treatments appeared to have little effect on the manifestation of crown gall the following year, but T1 had the most gall-free vines. These results suggest crop removal on vines in 2<sup>nd</sup> leaf may be beneficial to overall vine health and that crop removal after a significant freeze event may be warranted to reduce manifestation of crown gall symptoms in young vines.

## Postharvest Section

### Use of Enose to Determine Mango Maturity

*Elizabeth A. Baldwin<sup>1</sup>, Anne Plotto<sup>1</sup>, and Marc Lebrun<sup>2</sup>, <sup>1</sup>USDA-ARS Citrus and Subtropical Products Laboratory, 600 Ave. S.N.W., Winter Haven, FL 33880; <sup>2</sup>Food Processing Research Unit, CIRAD, Montpellier, France*

Three cultivars of Mango (*Mangifera indica* L.), ('Cogshall', 'Kent' and 'Keitt') were harvested at different maturities (61–115 days past flowering for 'Cogshall') and at different sizes (364–1563 and 276–894 average gram fresh weight for 'Keitt' and 'Kent', respectively) in Renion Island ('Cogshall') and Florida ('Kent' and 'Keitt'). Immediately after harvest or after one week of ripening at room temperature, fruit were homogenized or left intact and evaluated by gas chromatography (GC) or electronic nose (e-nose) for aroma and for solids and acids. Multivariate statistics was used to analyze volatile data from the different harvest maturities and ripening stages (Discriminant Factor Analysis). Both the e-nose and GC were able, in most cases, to separate fruit from different harvest maturities, especially for 'Cogshall' mangoes, at both the green and ripe stages as well as discriminate green from ripe fruit and fruit from the different varieties. Later-harvested fruit had lower acids, higher solids and generally higher levels of total volatiles. Mango fruit volatiles may be useful as maturity markers to determine optimal harvest maturity for mango fruit that results in full quality upon ripening.

### Quality of Four Basil Types after Storage at 3 to 10 °C

*Penelope Perkins-Veazie<sup>1</sup>, Angela Davis<sup>1</sup>, Niels Maness<sup>2</sup>, Stanley Rice<sup>3</sup>, Jamie Hyatt<sup>3</sup>, and Sarah Heil<sup>3</sup>, <sup>1</sup>USDA-ARS, South Central Agricultural Research Laboratory, Lane, OK 74555; <sup>2</sup>Department of Horticulture, Oklahoma State University, Stillwater, OK; <sup>3</sup>Biology Department, Southeastern Oklahoma State University, Durant, OK 74701*

Sweet basil (*Ocimum basilicum*) has global culinary use as a fresh herb. Basil can also be dried and extracted for its essential oils and grows extremely well in the warm climate of Oklahoma. Several cultivars of sweet basil are known to be chill sensitive when stored below 7 °C. In this study, four cultivars/types were grown organically at Lane, OK, in 2008, harvested at bloom stage, and held at 3, 5, or 10 °C for 7 days in vented plastic bags. 'Mrs. Burns Lemon' and 'Ethiopian' were most sensitive to low temperature storage, although all types showed chilling injury (leaf browning, flower discoloration, and chlorophyll loss) at 3 °C. 'Nufar' had much less chill injury than 'Genovese'. All varieties except 'Nufar' had high leaf abscission at 10 °C (7% to 15%), probably because relative humidity was low, ranging from 70 to 85%. Off odors were detected in basil held at 3 °C or at 10 °C. Holding basil below 7 °C for less than 4 days may help preserve quality if availability of dryer space is limited.

### Quality of Organically Grown Cherry Tomatoes for the Oklahoma Farm to School Program

*Penelope Perkins-Veazie<sup>1</sup>, Warren Roberts<sup>2</sup>, Shelia Magby<sup>1</sup>, and O'Hern Wyatt<sup>2</sup>, <sup>1</sup>USDA-ARS, South Central Agricultural Research Laboratory, Lane, OK 74555; <sup>2</sup>Department of Horticulture, Oklahoma State University, Wes Watkins Research and Extension Center, Lane, OK 74555*

Cherry and grape tomatoes offer local growers the opportunity to take advantage of the state farm-to-school program. In this program, locally grown fresh produce can be marketed through local sales or through food distributors for use in school and colleges. We determined that the ideal size of small tomatoes was 10 to 30 g. We selected two cherry fruited tomato cultivars, 'Baxters Early Bush' and 'Washington Cherry', that produced well in a conventional production system, for testing in an organic system at Lane, OK. Fruit were harvested fully ripe from plants, and stored at 5 °C for 1 week, followed by 2 days at 20 C. 'Washington Cherry' fruit had significantly more decay (48 vs. 12%) and weight loss (3% vs. 7%) than 'Baxters Early Bush'. Part of the decay was from early blight, which was not visible on fruit at harvest, but was prevalent on foliage, especially on 'Washington Cherry.' The lycopene content increased about 20% for both cultivars after storage, (80 to 100 mg/kg). Our results indicate that careful selection of disease tolerant cherry tomato cultivars is important to preserve fruit quality following harvest.

### Effects of Foliar Potassium Fertilization on Muskmelon Fruit Quality and Yield

*John L. Jifon<sup>1</sup> and Gene E. Lester<sup>2</sup>, <sup>1</sup>Texas AgriLife Research, Texas A&M University System, 2415 E. Business 83, Weslaco, TX 78596; <sup>2</sup>USDA-ARS, Kika de la Garza Subtropical Agricultural Research Center, 2413 East Highway 83, Building 200, Weslaco, TX 78596*

Consumer preference of many fruits and vegetables such as muskmelon [*Cucumis melo* L. (Reticulatus Group)] is determined by a few key quality traits such as sugar content, aroma and texture. These quality traits are directly related to adequate potassium (K) content in plant tissues. However, soil-derived K alone is seldom adequate to satisfy these fruit quality processes. Controlled environment studies have shown that supplemental foliar K applications can mitigate this apparent deficiency. However, the suitability of potential K salts as foliar sources is still uncertain. We evaluated six foliar K sources (potassium chloride - KCl, potassium nitrate - KNO<sub>3</sub>, monopotassium phosphate – Peak, potassium sulfate - K<sub>2</sub>SO<sub>4</sub>, potassium thiosulfate – KTS, and a glycine amino acid-complexed K- Potassium Metalosate, KM) for effects on fruit quality parameters of field-grown muskmelon (cv 'Cruiser') over two growing seasons, 2006 and 2007 in Weslaco, south Texas. Weekly foliar K applications were initiated at fruit set and continued to fruit maturity. Although soil K concentrations were very high, supplemental foliar K treatments resulted in higher K concentrations in plant tissues, suggesting that plant K uptake from the soil solution was not sufficient to saturate tissue K accumulation. In 2006, fruit yields were not affected by supplemental foliar K spray but in 2007, yields differed significantly among the foliar K sources with treated plots generally having higher yields than the control plots. Fruit from plots receiving supplemental foliar K had higher external and internal fruit tissue firmness than control fruit and this was associated with generally higher soluble solids concentrations (SSC) in both years. All the foliar K sources studied had positive effects on fruit quality parameters except for KNO<sub>3</sub> which tended to result in less firm fruit with lower SSC values. These results demonstrate that the apparent K deficiency caused by inadequate uptake can be alleviated by supplemental foliar K applications and that the effectiveness of foliar K fertilization will depend, not only on the source of fertilizer K, but also on environmental conditions affecting soil K availability and overall plant growth and development.

This material is based upon work supported in part by the Cooperative State Research, Education, and Extension Service, U.S.D.A. under Agreement No. 2006-34402-17121, "Designing Foods for Health" through the Vegetable & Fruit Improvement Center, Texas A&M University.