Abstracts of Presentations

from the

Annual Conference

of the

American Society for Horticultural Science

2–5 August 2010

Palm Desert, California

Supplement to *HortScience*

Volume 45(8) August 2010

Contains abstracts of symposia, colloquia, workshops, plus oral and poster presentations from the 2010 ASHS Annual Conference.

Author index begins on p. S316

For citation purposes, abstracts should be cited as follows:

(Example)

Smith, A.B. and C.D. Jones. 2010. Cold hardiness of peach trees as affected by cultural practices. HortScience 45(8):S234. (Abstr.)

American Society for Horticultural Science

1018 Duke Street, Alexandria, VA 22314

phone: 703.836.4606 • fax: 703.836.2024 • ashs.org • ashs@ashs.org

William Bauerle
Colorado State Univ, Fort Collins, CO; bauerle@colostate.edu

Marc van Iersel
Univ of Georgia, Athens, GA; mvanier@uga.edu

Taryn Bauerle
Cornell Univ, Ithaca, NY; bauerle@cornell.edu

Colin Campbell
Decagon Devices, Inc., Pullman, WA; colin@decagon.com

Richard Bauer
Antir Software, Jarrettsville, MD; bt3rb@mindspring.com

You receive the big grant, the accolades—and then reality hits. You have a big complex project with partners across the nation to get up and running—fast. Contracts need to be negotiated and signed, people hired and suddenly the Gantt chart at the back of the proposal seems so inadequate. Quarterlies are due, matching reports are required. What is one to do? Thankfully, your project has plan of governance and the institutional leads have thought through some of the key project management issues before submitting the grant, since now you really are now reliant on each other. If one cog isn't moving, this machine isn't going anywhere. This poster outlines the key components of our SCRI project management strategy and the tools we are using to ensure constant communication between our research, outreach and socio-economic teams, our advisory members and our grower partners. Most importantly, we outline how we are communicating our progress on a continuous basis to our industry and the public at large.

Specified Source(s) of Funding: USDA-NIFA SCRI Award: 2009-51181-05768

Wednesday, August 4, 2010 Springs F & G

Plant Nutrition 2

(176) Impact of Nitrogen Level and Form on Growth of Vetiver Grass

Suneetha Mondyagu
Illinois State Univ, Normal, IL; smondya@ilstu.edu

David Eliot Kopsell*
Illinois State Univ, Normal, IL; dkopsell@ilstu.edu

Vetiver grass (*Chrysopogon zizanioides* L. Roberty) is a warm season perennial grown for essential oil production, erosion control, and as a phytoremediation plant. It has also recently been proposed as a feedstock for biofuel production. Previous studies have focused on applications in treating various environmental problems; however, limited information exists on Vetiver fertility management practices in cropping systems. This study was undertaken to better understand the effects of nitrogen (N)-level and N-form on Vetiver growth and development. Plant slips of *C. zizanioides* 'Sunshine' (Florida Vetiver Systems, Maitland, Fla.) with 2-3 tillers were greenhouse-grown in Normal, Ill. (lat. 40°30'N) using nutrient solution culture in a randomized complete block design with four replications. In the first experiment, N-level treatments were 26.3, 52.5, 105, 210 and 410 mg N/L with a ratio of 3:1 nitrate-N:ammonium-N. In a second experiment, the ratio of nitrate-N: ammonium-N was varied from 0:100, 25:75, 50:50, 75:25, and 100:0 while keeping a total N level of 210 mg/L. Weekly observations on plant height and tiller number were taken for both studies. After 12 weeks of solution culture, accumulated shoot, root and total fresh weights, total leaf number, and chlorophyll content were assessed. Plant height increased, then decreased quadratically (P=0.03) in response to increasing N levels up to 10 weeks after transplanting (WAT) with maximum plant height at the 210 mg N/L treatment. However, at 12 WAT, there were no statistical differences among the N levels (P=0.67). In the second experiment, the greatest plant height was observed at 50:50 nitrate-N:ammonium-N (P=0.01) at 12 WAT. Vetiver accumulated the highest shoot fresh weight at 105 mg N/L and at 75:25 nitrate-N:ammonium-N. The greatest tiller number was observed at 26.3 mg N/L treatment (P=0.10) and at 0:100 nitrate-N:ammonium-N (P=0.08). Leaf number decreased linearly (P=0.10) and chlorophyll content increased, then decreased quadratically (P=0.10) as N level increased. Leaf number increased linearly (P=0.01) as the ratio of nitrate-N:ammonium-N changed from 100:0 to 0:100. Results demonstrate Vetiver has a tolerance to ammonium-N and may successfully be cultured under lower N fertility in cropping systems.

(177) Calculating Average pH in Substrate Research: Should pH or [H+] Data Values Be Used?

Eugene K. Blythe*
Mississippi State Univ, Poplarville, MS; blythe@pss.msstate.edu

Donald J. Merhaut
Univ of California, Riverside, CA; donald.merhaut@ucr.edu

Data on pH is often collected during research with container-growing substrates using the pour-through method or other extraction methods. A measure of acidity/basicity, pH is about equal to the negative of the base 10 logarithm of the molar hydrogen ion concentration ([H+]) of a solution. When analyzing pH data, a question that often arises among researchers is: Should the pH data values be converted to [H+] before calculating a mean value, then calculating the mean pH from the mean [H+]? However, a more general question may be preferable: What are appropriate measures of average acidity for substrate extract? When pH was measured from pour-through extract collected weekly over 12 weeks from 100 2.8-L containers of a compositionally uniform and accurately irrigated pine bark/peat moss/sand substrate, the distribution of the pH values was shown to be symmetrical (near-normal) from week to week, whereas the distribution the

[H+] values tended to be asymmetrical (skewed to the right). When a distribution is symmetrical, the (arithmetic) mean and the median are both acceptable measures of location, or average value. (With a perfectly symmetrical distribution, the mean and median coincide.) When a distribution is skewed, the median is typically a preferable measure of location since the median is less sensitive to extreme values than is the mean. Although the skewness of the [H+] values caused the distributions of the weekly data to show statistically significant deviations from a normal distribution, the deviations were not extreme. When values of mean pH calculated from pH values were compared with median pH calculated from pH values, mean pH calculated from mean [H+], and median pH calculated from mean [H+], all differences were within 0.02 pH units. Therefore, mean pH calculated directly from the pH data values is shown to be a valid summary measure of average acidity/basicity for container-substrate extract, with no data conversion from pH values to [H+] values being necessary. Median pH calculated directly from the pH data values was also a suitable summary measure of average extract acidity/basicity.

Specified Source(s) of Funding: Department, College, State, and/or HATCH

(178) Calcium Deficiency in Marigold

Touria El-Jaoual*
Univ of Massachusetts Amherst, Amherst, MA; eaton@umext.umass.edu

Douglas A. Cox
Univ of Massachusetts, Amherst, MA; dcox@pssci.umass.edu

Allen V. Barker
Univ of Massachusetts, Amherst, MA; barker@pssci.umass.edu

Iron-manganese toxicity disorder in marigold has been related to high concentrations of Fe and Mn and low concentrations of Ca and Mg in the affected leaves. This disorder may occur because of high Fe and Mn availability in media and lack of Ca in many fertilizers used in greenhouse crop production. To investigate the effect of Ca nutrition on marigold (*Tagetes erecta* L. 'First Lady') growth, appearance, and nutrient (Mn, Fe, Ca, and Mg) accumulation in the plant tissue, a solution-culture study with various Ca concentrations (2.5 to 100 mg/L) was conducted. After 90 days of growth, concentrations of Ca up to 15 mg/L resulted in stunted plants with chlorotic and necrotic symptoms on the leaves. The concentration 20 mg Ca/L resulted in stunted plants free of symptoms. Concentrations above 20 mg/l resulted in healthy plants with no leaf symptoms or stunting. The concentration 20 mg/L Ca may thus be considered as the incipient deficiency concentration for marigold. At this solution concentration, the Ca in the plant shoots was 0.54% dry weight, which is a low concentration relative to well-nourished marigold. Relative to adequate Ca nutrition, a low supply of Ca had no effect on Fe concentration in the growing point (buds and newest leaves) but resulted in a high concentration of Fe in the old leaves and old stems. Calcium deficiency did not affect the concentration of Mn in the old parts of the shoots but resulted in high concentrations of Mn in the growing points. Low Ca in the solution resulted in low Ca and high Mg in the shoots. This research suggests that inadequate Ca nutrition lead to increased Mn in marigold making it susceptible to Fe-Mn toxicity disorder.

Specified Source(s) of Funding: Risk Management Agency

(179) Manganese Toxicity in Marigold as Affected by Calcium

Touria El-Jaoual*
Univ of Massachusetts Amherst, Amherst, MA; eaton@umext.umass.edu

Douglas A. Cox
Univ of Massachusetts, Amherst, MA; dcox@pssci.umass.edu

Allen V. Barker
Univ of Massachusetts, Amherst, MA; barker@pssci.umass.edu

Iron-manganese disorder in marigold has been related to high concentrations of Mn and low concentrations of Ca in the affected leaves. Preplant addition of micronutrients in the media combined with constant feed program and low medium pH create favorable conditions for the development of Mn toxicity in greenhouse crops. Deficiency of Ca is due principally to low Ca in some fertilizers used in greenhouse production. To investigate the effects of Ca on Mn toxicity (growth, appearance, and nutrient concentrations) in marigold (*Tagetes erecta* L. 'First Lady'), a factorial, solution-culture study with various Ca (20 to 100 mg/L) and Mn (0.5 to 6.5 mg/L) concentrations was conducted. Treatments 20/6.5, 20/4.5, 20/2.5, and 100/6.5 mg/L Ca/Mn concentrations resulted in stunted plants with small brown spots, interveinal chlorotic patches and necrotic symptoms on the tips and margins of the leaves, and deformed leaves. Treatments 20/0.5, 100/2.5, and 100/4.5 resulted in stunted plants relatively free of symptoms. The treatment 100/0.5 resulted in fully grown and healthy looking plants. Concentrations of Ca at 20 mg/L (incipient deficiency concentration of Ca in marigold) reduced the critical toxicity concentration of Mn from 4.5 to 2.5 mg/L nutrient solution. The interaction between Ca and Mn in the solution had a highly significant effect on Fe and Mn in the plant tissue. Low Ca and high Mn in the medium resulted in increased concentration of Fe in the roots and Mn in the leaves and stems. At 20mg/L Ca in the nutrient solution and high Mn, the roots Fe was 1300 mg/kg dry weight (DW) whereas the Mn concentration in the roots, new leaves and old leaves were 500, 1300 and 1600 mg/Kg DW respectively. These results suggest that low Ca and high Mn nutrition lead to the Fe-Mn disorder in marigold.

Specified Source(s) of Funding: Risk Management Agency