



# Production Times

**UF** UNIVERSITY of FLORIDA  
IFAS Extension

Fall 2007  
Volume 14, Number 3

## Can the Right Potting Mix Replace Fungicide?

By Don Comis

Reprinted from the USDA ARS News and Events at [www.ars.usda.gov](http://www.ars.usda.gov)

◆ Production Times is brought to you by

Juanita Popenoe, Ph.D.  
Lake County  
Woody Ornamentals/Multi-County  
(352) 343-4101

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Potting mixes custom-tailored to fight plant diseases can work much better than systemic fungicides.

Agricultural Research Service (ARS) plant pathologists Leona Horst, James Locke and Charles Krause found this was true for a mix of peat, compost and the beneficial fungus *Trichoderma hamatum* strain 382. Horst and Krause are at the ARS Application Technology Research Unit in Wooster, Ohio. Locke is part of the unit's relatively new Greenhouse Production Research Group in Toledo, Ohio.

In a test with begonias, the scientists found that the mix reduced *Botrytis* gray mold, caused by the *Botrytis cinerea* fungus, better than the standard fungicide chlorothalonil did. *Botrytis* gray mold is the most common disease of greenhouse floral crops

such as begonia, carnation, chrysanthemum, cyclamen, geranium, impatiens, petunia and marigold.

The beneficial *Trichoderma* fungus seems to enter the plants through the roots and spread through the entire plant internally. One advantage of systemic biocontrol—as opposed to spraying the plant leaves with a solution containing beneficial fungi—is that it doesn't leave a residue on the plant that harms plant market value.

Begonias grown in this mix had much fewer gray mold symptoms and much higher market value than those grown in straight peat and sprayed with chlorothalonil. The improvement in plant quality and market value makes the *Trichoderma*-compost mix very promising for

(Continued on page 4)

**Business Disaster Plan—create your own plan at [www.FloridaDisaster.org](http://www.FloridaDisaster.org) with critical suppliers and vital records in a form that can be printed out and saved for future emergencies. The Florida Division of Emergency Management recently launched this web tool to help businesses plan for disaster.**



# Research Roundup

By Juanita Popenoe

The following is a summary of research reported at the American Society for Horticultural Science Southern Region 2007 Annual Meeting and recently in HortTechnology.

- **Response of Texas and Florida Live Oak Seedlings to Water Deficit Treatments** – Compared seedlings from Groveland, FL (a humid site) and Justiceburg, TX (a dry site) and found that seedlings from central Texas are better adapted to dry, xeric sites than live oaks from a mesic (humid) site. This provides further proof that provenance is important in plant success.
- **Influence of a Modified Pot-in-Pot Strategy on Root Temperature and Growth of Rhododendron x 'Mrs. G.G. Gerbing' in Full Sun** – Utilized a raised bed, double-row pot-in-pot production system with sockets in a triangular design with plants 24 inches apart in rows 8 inches apart to study the differences between black or white weed barrier and middle of the double row irrigation line to cool soil beneath the weed barrier. They found no differences in the pot-in-pot production with these alterations, but the pot-in-pot plants were superior to plants grown in full sun above-ground and the 50% shade house.
- **Growth Modification of Bedding Plants using ChromatiNeting** – Compared the growth responses of six bedding plants, Dianthus 'Dynasty Red', 'Sun Leaper' tomato, 'Sweet X3R Camelot Hybrid' pepper, 'Crimson Rambler' morning glory, 'Patron' broccoli and 'Blue Vantage' cabbage, under five colors of ChromatiNeting in a double polycarbonate greenhouse in Auburn, AL. Black ChromatiNeting reduced shoot height in dianthus, pepper, morning glory, broccoli and cabbage but shoot height was the same as blue and gray in several cases. Pearl ChromatiNeting yielded the tallest plants

in tomato, pepper, morning glory, broccoli and cabbage, but these plants were the same height as outside light or red in several cases.

- **Clean Chip Residual Substrate for Container-grown Perennials: Effect of Supplemental Nitrogen Rates** – Clean chip residual (CCR) is composed of 42% pinebark, 9% needles and 49% wood from residue remaining after in-field harvesting of pine wood chips for the paper industry and is thought to require more nitrogen when used as potting media. This study compared the growth of buddleia, gaura and coreopsis in CCR and 6 month aged pinebark with four rates of supplemental nitrogen. Their results indicate that the plants tested had similar growth when grown in CCR or pinebark and did not require any extra nitrogen.
- **Infectivity of Mycorrhizal Products Marketed for Trees in Urban and Landscape Soils** – Compared the effect of commercial mycorrhizal products on growth of corn, sorghum, trident maple and sweetbay magnolia in the greenhouse. They found that the commercial products only resulted in 5% or less mycorrhizal colonization, while lab-cultured inoculant yielded much higher colonization. However, the commercial products generally improved corn and sorghum shoot growth and increased soil concentrations of phosphorus, potassium, calcium and magnesium in a dose-dependent manner. The commercial products did not increase mycorrhizal colonization or shoot growth in magnolia or maple saplings. Success of commercial mycorrhizal products will depend on improvement of the current retail distribution methods to improve survivability of the mycorrhizal fungus.
- **Final Summary of All-America Daylily**

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**Evaluations: Rust Observations, Flowering, and Landscape Performance** – All-America daylily cultivars evaluated at LSU indicate cultivars resistant to daylily rust are: ‘Miss Mary Mary’, ‘Chorus Line’, ‘Lullaby Baby’, and ‘Bitsy’. Slightly susceptible cultivars were ‘Black Eyed Stella’ and ‘Frankly Scarlet’. ‘Plum Perfect’ was moderately susceptible. Highly susceptible cultivars were ‘Red Volunteer’, ‘Lady Lucille’, ‘Starstruck’, ‘Leebea Orange Crush’, and ‘Judith’. Cultivars in bloom the most days were ‘Miss Mary Mary’, ‘Lady Lucille’, ‘Bitsy’, and ‘Black Eyed Stella’. The earliest to bloom cultivars were ‘Bitsy’, ‘Black Eyed Stella’, ‘Judith’ and ‘Miss Mary Mary’. Repeat bloomers were ‘Lady Lucille’, ‘Bitsy’, and ‘Black Eyed Stella’.

- **Initial Landscape Shrub Rose Observations: ‘Knock Out’, ‘Home Run’, ‘Wild Thing’, and ‘Nearly Wild’** – Roses were evaluated in the landscape in Baton Rouge, LA for performance and blackspot susceptibility. Blackspot was not seen on ‘Knock Out’ or ‘Home Run’,

while minor blackspot was seen on ‘Nearly Wild’ and ‘Wild Thing’. ‘Knock Out’ had the highest visual quality, although in monthly evaluations it was often similar for ‘Home Run’.

- **The Effect of a Garlic Extract and Root Substrate on Soilborne Fungal Pathogens** – *Pythium aphanidermatum*, *Pythium irregulare*, *Pythium ultimum*, *Phytophthora cinnomomi*, *Phytophthora nicotianae*, *Rhizoctonia solani*, *Fusarium oxysporum* and *Thielaviopsis basicoli* failed to grow in nutrient solutions containing 10% or higher levels of garlic extract or a fungicide control. When tested in peat-based potting media, a single application of at least 35% garlic extract or two applications of 25% extract killed all the *Pythium aphanidermatum* in the medium. A single application of 25% garlic extract or two applications of 10% extract were enough to kill off the *Pythium aphanidermatum* in sand. Garlic extract was found to be fungicidal against a broad range of soilborne fungal pathogens, but the concentration required to kill the pathogens varied with the potting mix.



## Tip for Greenhouse Growers: Add Silicon

By Don Comis

Reprinted from the USDA ARS News and Events at [www.ars.usda.gov](http://www.ars.usda.gov)

Modern greenhouse production methods have often eliminated conventional earth as a growth medium and, with that, eliminated silicon, a mineral naturally found in soil.

Greenhouse growers might do well to add silicon back in their nutrient applications, irrigation or potting mixes, according to Agricultural Research Service (ARS) scientists. That's because a growing body of research suggests that silicon boosts yields and protects plants from toxicity and fungal diseases. This means silicon may reduce the need for plant growth regulators and disease-control pesticides.

Over the past three years, scientists have studied

silicon uptake in a variety of ornamentals, including begonia, carnation, geranium, impatiens, marigold, orchid, pansy, petunia, snapdragon, verbena and zinnia.

X-ray analysis has shown that some of these plants—such as New Guinea impatiens, marigold and zinnia—accumulate silicon in significant concentrations in unique cells in their leaves. The researchers want to see which crops put nutrients where they are most useful to the plant.

The scientists also tested some of these plants to see if silicon imparts resistance to two widespread pathogenic fungi, gray mold and pow-

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(Continued from page 1) *Right Potting Mix*

greenhouse operations. Also, *Botrytis* has developed resistance to several fungicides.

The *Trichoderma* fungus thwarts *Botrytis* on more than one front. It prevents *Botrytis* from infecting fresh wounds, and produces compounds that keep *Botrytis* spores from germinating.

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(Continued from page 3) *Greenhouse Tips*

dery mildew. They found that it helps reduce symptoms of powdery mildew in zinnia but has no effect on species such as begonia and geranium, which do not accumulate silicon. The scientists will continue to use similar tests to see if silicon accumulates in the leaves of

Surprisingly, the compost mix had a similar effect even without *Trichoderma*. This means there could be naturally occurring beneficial fungi or other biocontrol agents in the compost.

But, growers need to add beneficial fungi like *Trichoderma* to their mix, because they can't count on commercial composts to have them naturally.

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other ornamental crops and test those crops for silicon-induced resistance to insect pests.

Such knowledge about plants' silicon use will help breeders choose promising lines for creating new varieties of flowers and ornamental plants that will need fewer pesticide applications.

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## 2007 Planning Calendar

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Links to most programs and agendas may be found at: <http://cfextension.ifas.ufl.edu> or the UF Extension Calendar at <http://calendar.ifas.ufl.edu/calendar/index.htm>

### July

11, 18, 25.....Nursery BMP and Water Use Workshops. Contact Maggie Jarrell (352) 343-4101.

28 .....Review and Exam. Limited Certification Licenses. Tavares. Contact Maggie Jarrell (352) 343-4101

### August

9-11.....Southern Nursery Association Forum 2007, Atlanta, GA <http://www.sna.org/>

30.....Review & Exam Ornamental/Turf & Private App. Orlando. Contact Celeste White (407) 254-9200

### September

15.....Review and Exam. Limited Certification Licenses. Tavares. Contact Richard Tyson (407) 665-5551

19.....Floriculture Update Series: Apply Water and Nutrients Efficiently. Contact Maggie Jarrell (352) 343-4101.

### October

4-6.....FNATS The Landscape Show Orlando, FL <http://www.fngla.org/>

18.....Review & Exam Right of Way & Aquatic. Orlando. Contact Celeste White (407) 254-9200

28-31..International Plant Propagators' Society Southern Region Annual Meeting Chattanooga, TN. <http://www.ipps.org/southernna/index.htm>

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## Speakers:

Steve Cox  
East Central Florida Resource  
Conservation & Development  
(ECFRCD)  
(321) 231-4851 or Rance Ellis at  
(321) 231-4853  
Contact them to set up a BMP  
assessment at your nursery

 Bobby Brown  
Lake County Mobile Irrigation  
Lab team leader  
(352) 343-2481 x 6  
james.brown@fl.nacdnet.net  
Contact him to set up a free  
irrigation evaluation

## Presented by Your Local County Extension:

Juanita Popenoe  
Lake Co. Extension  
1951 Woodlea Rd., Tavares  
(352) 343-4101



## Program Locations

**July 11** Seminole Springs Herb  
Farm and Antique Roses,  
34935 W. Huff Rd. Eustis  
(across the street and just  
north of Seminole Springs Ele-  
mentary School)

**July 18** Matlack Tree Farm  
11631 CR 561 Clermont (2  
miles south of Hwy 50)

**July 25** Zephyr Lake Nursery  
2605 Cooke Rd. Fruitland Park  
(west off 441 at Flea Market)



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# Who's Afraid of BMPs?

(Best Management  
Practices)



## And Fertilizer?

July 11, 18 and 25, 2007  
10:00 AM - 12:00 PM

An Extension Program at a  
nursery near you

**FREE Program**  
Registration requested

# Who's Afraid of BMPs?



## Lake County Nursery Best Management Practices and Water Efficiency Workshops

Program from 10 am – noon:

Learn what BMPs are and how they may affect you in the future.  
Learn how an assessment is done at a local nursery.  
Learn what Nursery BMPs can do for you.  
Learn about the free Lake County Mobile Irrigation Lab.  
Learn how they can help you save on your irrigation bills.  
Find out the facts at a location near you.

**July 11** Seminole Springs Herb Farm and Antique Roses  
34935 W. Huff Rd., Eustis (across the street from  
Seminole Springs Elementary School)

**July 18** Matlack Tree Farm  
11631 CR 561, Clermont (2 miles south of Hwy 50)

**July 25** Zephyr Lake Nursery  
2605 Cooke Rd., Fruitland Park

# Who's Afraid of BMPs?

July 11, 18 and 25

**FREE!**

Registration Requested. Mail or Fax this form, or  
Email or Call with the information.

**Please print clearly!**

Name of Organization \_\_\_\_\_

Phone:(        ) \_\_\_\_\_

Mailing Address:  
\_\_\_\_\_  
\_\_\_\_\_

\_\_\_\_\_ Zip \_\_\_\_\_

County (required) \_\_\_\_\_

**BRING YOUR OWN LAWN CHAIR!**

Email, Fax, Call or Send to:

Maggie Jarrell

mjarrell@ufl.edu

Lake County Extension Office

1951 Woodlea Rd.

Tavares, FL 32778-4204

(352) 343-4101

FAX 352-343-2767

Participants requiring special accommodations contact  
Maggie Jarrell a day before the program.



## Your Speakers:

**Paul Fisher, PhD.**  
Environmental Horticulture  
University of Florida  
Gainesville

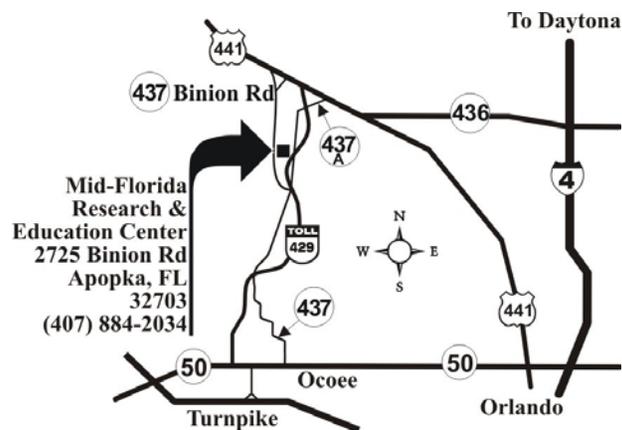
**Bill Argo, PhD.**  
The Blackmore Company  
Belleville, MI

## Your Extension Agent:

**Juanita Popenoe, PhD.**  
Commercial Horticulture  
Lake Co. Extension  
1951 Woodlea Rd.  
Tavares, FL 32778-4204  
352-343-4101



## Afternoon Program Location



## Morning Program Location

**Knox Nursery, Inc.**  
940 Avalon Rd.  
Winter Garden, FL



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# Floriculture Update Series: Apply Water and Nutrients Efficiently



Workshop for  
Nursery Growers  
and Workers Knox  
Nursery and Mid-  
Florida Research  
and Education  
Center Apopka

September 19, 2007  
8:45 am—3:30 pm

**Floriculture Update Series:**

# Apply Water and Nutrients Efficiently

September 19, 2007 8:45 am—3:30 pm

Cost: \$40 Reserve your space early, seating is limited.

A workshop for greenhouse or nursery growers. Dual tracks in English and Spanish in the morning; English only in the afternoon; handouts provided in both languages.

## Program:

**8:45-9:15:** Check in at Knox Nursery, Inc., 940 Avalon Rd., Winter Garden

**9:15-12:00:** Hands-on programming at nursery location in Spanish and English

- ⇒ Choosing fertilizer types and concentrations
  - ⇒ Water quality - how does that affect irrigation and fertilizers
  - ⇒ Fertilizers - how to read a fertilizer label
  - ⇒ Selecting water-soluble fertilizers
  - ⇒ Selecting slow-release fertilizers
- ⇒ Media
  - ⇒ How the growing medium affects nutrients and irrigation
  - ⇒ Alternative media components
- ⇒ Watering method and leaching
  - ⇒ How to measure leaching
  - ⇒ Relationship between leaching, growing medium, and fertilizer
  - ⇒ Timing and method of irrigation
  - ⇒ Dealing with water restrictions

**12:00:** Morning workshop finishes. Boxed lunch provided to those attending morning session only.

**12:00 to 12:30:** Travel to Mid Florida Research and Education Center, 2725 S. Bin-ion Rd., Apopka

**12:30-1:15:** Boxed lunch and sponsor displays.

**1:15-2:15:** Nutrition management (English only)

**1:15 to 1:30:** Break

**2:30 to 3:30:** pH management (English only)

# Apply Water and Nutrients Efficiently

Nursery Workshop and Seminars at MREC

**Non-refundable Registration \$40**

**September 19, 2007 8:45 am-3:30 pm**

Registration Deadline: Sept. 12 Seating is limited

Name \_\_\_\_\_

Company \_\_\_\_\_

Address \_\_\_\_\_

City, State \_\_\_\_\_

County (required) \_\_\_\_\_

Zip \_\_\_\_\_

Phone \_\_\_\_\_

Morning Session:

English

Spanish

Afternoon Session

Please detach and mail completed form with checks payable to **Horticulture Advisory Account** to:

**Lake County Extension Office**

**1951 Woodlea Rd.**

**Tavares, FL 32778-4204**

**(352) 343-4101**



Participants requiring special accommodations contact Maggie Jarrell by September 12, 2007.

**LIMITED PESTICIDE LICENSE CERTIFICATION REVIEW AND EXAM**

***\$20 PER PERSON NON-REFUNDABLE FEE FOR CLASS***

**LAKE COUNTY EXTENSION, TAVARES, FL – SATURDAY, JULY 28, 2007**

If you plan to take an exam, you should study the training manuals. They can be ordered at 800-226-1764 or <http://ifasbooks.ufl.edu> - SM1- Applying Pesticides Correctly, and either SM7- Ornamental and Turf Pest Control or SM47-General Household Pest Control Applicator Training Manual. Exams are administered **only** with a completed application, photo and license fee or if you choose to expedite the process on Review and Exam Day you can bring in an approval letter from the Bureau of Entomology & Pest Control. Applications are available from the Bureau of Entomology and Pest Control. See web locations below for applications and submittal information.

- **Limited Certification for Governmental & Private Applicators – Lawn & Ornamental** - A license is necessary for each government employee, business owner or their employees who applies pesticides outdoors of a government or business owned buildings. <http://www.flaes.org/pdf/lmtdpckt.pdf>
- **Limited Certification for Governmental & Private Applicators – Structural** - A license is necessary for each government employee, business owner or their employees who applies pesticides indoors of a government or business owned buildings. <http://www.flaes.org/pdf/lmtdpckt.pdf>
- **Limited Certification for Commercial Landscape Maintenance** - A license is necessary for each commercial landscape maintenance person who applies pesticides to ornamental plant beds. <http://www.flaes.org/pdf/lndspckt.pdf>

8:00 – 8:30 am	Registration
8:30 – 10:15 am	Review for all exam categories Pesticide Safety, Labels, Laws and Regulations and Pest Identification
10:15 – 10:30 am	Break
10:30 – 11:20 am	IPM and Biological Control
11:20 am – 12:10 pm	Key Plants/Key Pests
12:10 – 1:10 pm	Lunch on your own
1:10 – 2:00 pm	Why Landscapes Fail
2:00 – 2:50 pm	Mistaken Identities
2:50 – 3:15 pm	Break/ Study
3:15	Exams administered for Limited Certification Licenses



**LIMITED CERTIFICATION REVIEW REGISTRATION – SATURDAY, JULY 28, 2007**  
**\$20 PER PERSON NON-REFUNDABLE FEE FOR CLASS**

Name \_\_\_\_\_

Business \_\_\_\_\_

Mailing Address \_\_\_\_\_

City/State/Zip \_\_\_\_\_

Phone (\_\_\_\_) \_\_\_\_\_ Fax \_\_\_\_\_

Email \_\_\_\_\_

Please check which license you're applying for:	
Limited Lawn & Ornamental	<input type="checkbox"/>
Limited Structural	<input type="checkbox"/>
Limited Landscape Maintenance	<input type="checkbox"/>

Do you need a confirmation? How should we send it?

Fax       Email

Deadline to register: July 25, 2007. Make check payable to "Horticulture Advisory Account" and send to Maggie Jarrell at Lake County Ext, 1951 Woodlea Road, Tavares, FL 32778. Special accommodations: Persons with disabilities needing assistance to attend should contact the County Extension Office at least 5 working days in advance of the meeting.

# LAKE COUNTY EXTENSION 1951 WOODLEA ROAD TAVARES, FL



The Lake County Extension Office is located just north of the Florida Turnpike, between I-75 and I-4.

#### Directions

**From the Turnpike**, take Exit #289, Leesburg North (US 27) to US 441.

**From I-75**, take Exit #329, SR 44 East.

Where US 27 and US 441 merge, take US 441 South to Tavares. As you enter Tavares, veer off to the right on Old 441. Turn right at the first traffic light onto SR 19, heading South. Turn right again at the third traffic light at Woodlea Road. The Extension Office is on the left. It is a cream-colored one-story building.

**REVIEW AND EXAMS FOR RESTRICTED USE ORNAMENTAL & TURF OR  
 PRIVATE AGRICULTURE APPLICATOR PESTICIDE LICENSES**

ORANGE COUNTY EXTENSION SERVICE, ORLANDO, FL. – AUGUST 30, 2007

**\$20 NON-REFUNDABLE FEE FOR THE CLASS**

**Private Applicator Agricultural** - This license will be issued to persons who apply or supervise the application of restricted use pesticides for agricultural production such as vegetable, fruit, or cattle farm, sod farm or nursery and greenhouse. You will need to take **both** the General Standards exam and the Private Agricultural Applicator exam.

**Ornamental and Turf** – This license is for persons employed on a golf course, park, athletic field, or cemetery. You will need to take **both** the General Standards exam and the Ornamental and Turf exam.

Training manuals cover exam questions SM1-Core/General Standards, SM7 & SM38-Ornamental and Turf, SM53-Private Ag. They can be ordered at 800-226-1764 or <http://ifasbooks.ufl.edu> *If you plan to take an exam, you should study the training manuals.*

8:00 - 8:30 AM	Registration
8:30 – 11:00 AM	Review for the General Standards Exam
11:00 - NOON	IPM and Pests
NOON – 1:00 PM	<b><i>Lunch on your own</i></b>
1:00 - 2:00 PM	Calibration/Equipment Review
2:00 PM	All Exams Administered



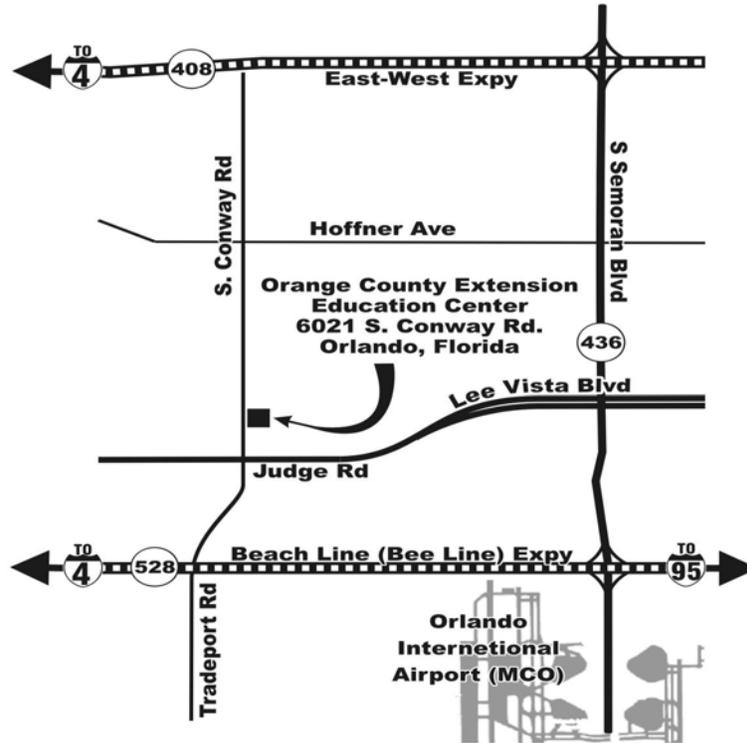
**REGISTRATION REQUIRED - \$20 NON-REFUNDABLE  
 PESTICIDE APPLICATOR TRAINING & TESTING  
 AUGUST 30, 2007**

Name _____	<b>CHECK WHICH CLASS YOU WILL BE ATTENDING</b>		
Business _____	General Standards (CORE)	Review	<input type="checkbox"/>
Address _____		Exam	<input type="checkbox"/>
_____	Private Applicator Agricultural	Review	<input type="checkbox"/>
City/State/Zip _____		Exam	<input type="checkbox"/>
Phone (____) _____ Fax _____	Ornamental/Turf	Review	<input type="checkbox"/>
Email _____		Exam	<input type="checkbox"/>

Confirmation of registrations by:  Fax  Email

**Deadline to register: August 24, 2007.** Make check payable to "Orange County Extension Fund" and send to Celeste White, at 6021 S. Conway Rd. Orlando, FL 32812. **Special accommodations: Persons with disabilities needing assistance to attend should contact the County Extension Office at least 5 working days in advance of the meeting.**

Orange County/UF/IFAS Extension Education Center  
6021 South Conway Road  
Orlando, FL 32812-3604  
Office: (407) 254-9200  
Fax: (407) 850-5125  
<http://landscape.ifas.ufl.edu>



**From north Orange County:** Take I-4 west to E. Michigan Street and turn left. Continue to Bumby Avenue and turn right. Turn left on Lake Margaret Drive, then turn right on Conway Road. Continue south approximately 3 miles to the Extension Education Center at 6021 S. Conway Road.

**From west Orange County:** Take Colonial Drive to I-4 West. Exit at E. Michigan Street and turn left. Continue to Bumby Avenue and turn right. Turn left on Lake Margaret Drive, then turn right on Conway Road. Continue south approximately 3 miles to the Extension Education Center at 6021 S. Conway Rd.

**From east Orange County:** Take Colonial Drive west to Semoran Blvd / 436 and turn left. Continue south for approximately 5 miles, then turn right on Hoffner Road. Turn left onto S. Conway Road. Continue south approximately 0.8 miles to the Extension Education Center at 6021 S. Conway Rd.

**From south Orange County:** Take Sand Lake Road to Jetport Drive (near Boggy Creek Road). Go straight on Jetport Drive, then turn left onto Tradeport Drive. Tradeport Drive becomes S. Conway Road. Continue north approximately 0.9 miles to the Extension Education Center at 6021 S. Conway Road.