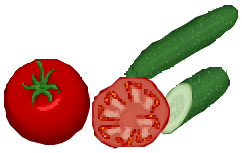
UNIVERSITY OF FLORIDA
EXTENSION
Institute of Food and Agricultural Sciences

Berry/Vegetable Times

February 2004



In this issue...

The Need for Unified Certification Standards and Procedures	Page 2
Best Management Practices Started the Strawberry Season	Page 2
Plant Disease Losses have been Low, but…	Page 4
Apogee Research on Strawberries	Page 4
Spotlight on Strawberry Diagnostics	Page 5
GCREC Welcomes Natalia Peres as the new Plant Pathologist	Page 5
OSHA Injury/Illness Summary Reports to be Posted Feb. 1	Page 5
Pesticide Registrations and Actions	Page 6
Watermelon Vine Decline and Fruit Rot Alert	Page 6

Calendar of Events 2004

Feb 23-25 NASGA 2004 North American Berry Conference. Hilton Tampa Airport Westshore. For info, www.nasga.org.

Feb 26 Blueberries, Peaches & Plums for West Central Florida meeting, 9-12. Hillsborough County Extension Office. RSVP, Traci Buck, 813-744-5519, ext. 104. See program on last page.

March 9 Pesticide Testing, Hillsborough County Extension Office, Seffner, 9am.. 744-5519.

March 23-27 ISHS- Symposium for Protected Culture in Mild Winter Climates, Kissimmee, Fl. www.conference.ifas.ufl.edu/ishs.

June 21-24 International Symposium on Tomato Disease and 19th Annual Tomato Disease Workshop. Grosvenor Resort, Walt Disney World, Orlando. For more information visit http://plantdoctor.ifas.ufl.edu.

From Your Extension Agent…*Alicia Whidden*

A chemical company representative at a recent grower meeting talked about the mixing order for adding their chemical to the spray tank. This made me think that it would be a good idea to have a "refresher course" on this important topic. When you are preparing the spray material, first **READ THE LABELS** of **all** the products you will be using in the spray mix. The labels contain valuable information to help make the products as effective as possible. The label will tell you the correct pH of the spray solution for the chemicals to be most effective, if there are any known problems with tank mixes of this product and other chemicals and if any adjuvants need to be used to make the product more effective. Also the label will tell you if there are special environmental conditions to avoid when spraying to prevent spray burn problems.

Now on to the proper mixing order of the chemicals: First fill the spray tank ½ full of water and adjust pH if needed. Start agitation and add chemicals in the following order: **1.** Wettable powders go in first and must be mixed thoroughly. A slurry can be made and added to the spray tank to help dissolve the powder. **2.** Dry Flowables or water-dispersible granules - then add more water to the tank. **3.** Water-dispersible liquids **4.** Emulsifiable concentrates **5.** Water-soluble liquids. Agitate well after each addition and before adding the next chemical. Finish filling spray tank with water.

If you are using two or more chemicals in the spray tank or are adding a fertilizer to the spray tank and do not have experience with that particular spray combination you may want to do a compatibility test first to make sure the chemicals are compatible and do not precipitate in the tank and leave you with a tank full of "gunk". You can do a simple jar test to make sure your spray combination will stay in liquid form.

Jar Compatibility Test:

1. Use a quart jar with a lid and add 1 pint water (2 cups) adjusted to pH recommended by spray label.
2. In the proper mixing order, add the amount of pesticide from the table below that corresponds to the label rate and shake gently after each addition.
3. Add any fertilizer and shake gently.
4. Let the jar sit for 5 minutes and then look at the solution. You are looking for precipitants such as flakes, sludge or the whole solution solidifying. Wait at least 30 minutes to be sure there will be no problems with this combination of chemicals. Emulsifiable concentrates will

(Continued on page 2)

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usually rise to the top over time and wettable powders can settle out. If after 30 minutes you can shake the jar and everything will go back into solution then with agitation in the spray tank you will be able to spray this solution.

5. Some combinations don't work without a compatibility agent to keep the chemicals from reacting with each other. Be sure to do a compatibility test with the agent first to be sure it will work.

Amount of pesticides for compatibility test

Type of Chemical	Rate/ Acre	Teaspoons to add to jar
Wettable Powder	1 lb	1.5
or	2 lb	3.0
Dry Flowable	3 lb	4.5
	4 lb	6.0
Emulsifiable Concentrate	1 pt	0.5
or	1 qt	1.0
Water-disperible Liquid	2 qt	2.0
Water-soluble liquids	4 qt	4.0

The Need for Unified Certification Standards and Procedures

R.D. Milholland and C.W. Averre Emeritus Professors of Plant Pathology, North Carolina State University

Strawberries are a high-income-per-acre crop that justifies the use of effective disease management strategies. To control soilborne diseases and weeds in both nurseries and fruiting fields, the soil is fumigated with custom-blended mixtures of methyl bromide and chloropicrin before planting. Despite the use of methyl bromide, several disease management strategies are often required to control devastating diseases (anthracnose, Phytopthora, angular leaf spot) that attack strawberry. These include resistant cultivars, chemicals, and pathogen-indexed planting stock. The program of maintaining Nuclear stock and producing Foundation, Registered, and Certified strawberry plants is vital to the strawberry industry.

The increased interdependence of strawberry producing regions in the U.S. and throughout the world has shown the need for unified certification procedures and standards. This must address quality and uniformity of planting stock that are free from pathogens and other pests. It is important that several sources of certified planting stock be available to commercial berry growers. The use of pathogen-indexed planting stock is one of the most effective control methods for strawberry anthracnose, Phytophthora, and other devastating diseases. This is achieved at little or no cost to berry growers.

The Micropropagation Unit (MPU) and the N.C. Strawberry Certification programs have supplied fruit growers with high quality, true-to-type, anthracnose-free plants for the past three years. Plants from the Certified nurseries have performed equally as well as plants from any other sources without having anthracnose and Phytophthora infected plants.

The N.C. Certification program is continuing to expand and, supplying Certified plants to berry growers in N.C. and throughout the southeast. This year, three Registered nurseries will raise Registered plants for seven Certified nurseries. Both bare root and runner tips (plug plants) of Camarosa, Chandler, Festival, Treasure, and Sweet Charlie will be available. In 2005, the N.C. Certification program will have the ability to produce about 40 million Certified plants. Additional programs that meet the rigid certification procedures and standards will be required if berry growers throughout the southeast are to be supplied with high quality, uniform, anthracnose- and Phythopthora-free strawberry plants.

It is important for fruit growers to realize that at least a two year lead time is necessary to increase Certified plants to meet their needs for high quality planting stock. The anthracnose and Phytophthora problems in the state and elsewhere can be expected to continue so long as infected plants are used by strawberry nurseries and growers.

For more information on the North Carolina Strawberry Certification program, contact Dr. Zvezdana Pesic-Van Esbroeck by phone at (919) 515-7781 or by e-mail at zvezdana_pesic@ncsu.edu.

Best Management Practices Started the Strawberry Season

Silvia I. Rondon[1], Daniel J. Cantliffe[1], and James F. Price[2]
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From our perspective, the first part of the 2003-2004 strawberry season has been good for the strawberry industry. By February 2004 the strawberry harvest was well under way and some farms had already experienced early problems with twospotted spider mite, aphids, and budworms; however, sound in-

(Continued on page 3)

tervention decisions, and good timing resulted in effective control in most cases.

Summary of the 2003-2004 Season. This year strawberry transplants from most nurseries arrived with less than usual spider mite problems. Some growers reported better than expected results for spider mite clean-up of young transplants by applying Brigade? (bifenthrin) pyrethroid plus Diazinon? (organophosphate) immediately after the transplant establishment period (Figure 1). We should not expect serious losses from spider mites even with an expected increase in mite numbers in February, since several effective biological and chemical control measures are now available.

Appearances of other pests such as lepidopterous larvae ('worms') and aphids normally start in February; however, adequate control measures are presently available for these pests. Problems with thrips increase in warm weather with moderately to high temperatures. However, cooler weather in mid-January has led to low thrips populations. According to Hillsborough county agent Alicia Whidden (Berry/Vegetables Times January 2004) some farmers reported fruit bronzing and cracks under the calyx. These problems may have been related to consecutive applications of sulphur used for powdery mildew as well to thrips and aphid damage. UF researchers are investigating whether the sulphur related damage in order to minimize the ill effects of the fungicide.

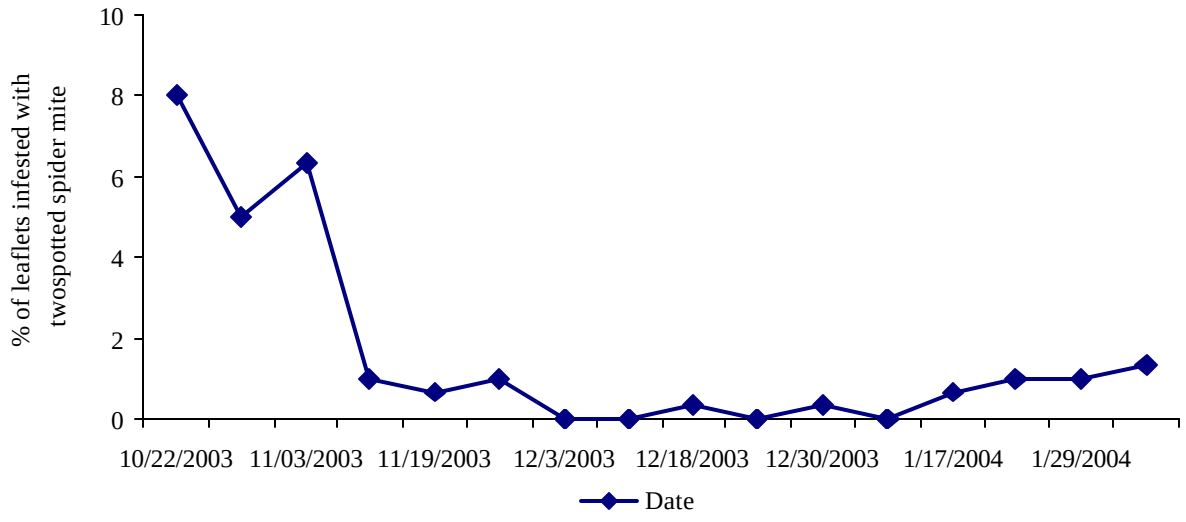
Benefits of Using an Best Management Practices. Some of the pesticides that are currently used on Florida strawberry farms to control arthropods include organophosphates which are considered to pose the greatest risk for human health and the environment. The high level of pesticide use combined with the frequent harvesting means that there is a risk of occupational exposure to these pesticides by crop workers. Reduction of higher risk pesticide use in strawberries through Best Management Practices based on various control measures which include cultural, biological, and chemical control compatible with biological methods, are important to reduce environmental hazards and human exposure, cost to farmers, and insect resistance. Thus, the continued use of only one practice, i.e. chemical control only, can be extremely costly in terms of chemical expenditures and their application but more importantly, losses due to rapid build-up of insect and mite resistance to the chemicals applied. Ultimately, the combination of control measures will lead to the greatest return to profit in terms of fruit quality and yield for the least long term expense.

Biological Control of Strawberry Pests: The Twospotted Spider Mite. For the past couple of years, we have studied the impact of utilizing new biological control methods (lady beetles, minute pirate and bigeyed bug) to control strawberry arthropod pests. We have established experimental trials in Floral City (Citrus County), Plant City (Hillsborough County), and Dover (Hillsborough County) to evaluate the feasibility of using one or both species of predatory mites: *Phytoseiulus persimilis* Athias-Henriot and *Neoseiulus californicus* McGregor to control mites throughout the season.

This project is being conducted with growers, extension personnel, and a crop consultant to per-

(Continued on page 4)

Figure 1. Population dynamics of twospotted spider mite after Brigade? plus Diazinon? application on a commercial farm. Only one insecticide application was made (10/21/03). Percentage of twospotted spider mites steadily decreased throughout the season (y axis by 10).



form on-farm demonstrations and experiment station trials. We are using predatory mites in combination with miticides to control twospotted spider mites to look to complete fall season control. Further, the use of other chemical management schemes has been integrated into the use of predator mites as a control measure. Thus, besides fall season mite control we are investigating full season control of other insects and diseases pests. Information obtained from these studies will be presented in workshops and field-days this spring and summer to train growers in basic biological control pest management techniques. Refer also to Berry/ Vegetable Times November 2003 issue (http://strawberry.ifas.ufl.edu/).

The strawberry season should continue for two more months. With this sound start and a little luck, the 2003-2004 season should be very satisfactory for the industry.

Plant Disease Losses have been Low, but…

Jim Mertely

Strawberry diseases have been relatively mild this season. Like the weather, this may be starting to change. In late January, we saw rain on the 27th, a freeze with overhead irrigation on the 29th, and 48 hours of rains and overcast skies at the end of the month. This period was ideal for *Botrytis cinerea*, if the plants were flowering at the time. Hopefully, flowering fields were adequately protected by shortening the intervals between fungicide applications, and tank mixing Elevate, Pristine, or Switch with the normal protectant fungicide. Spraying these products during the mid-January to mid-February bloom period should control Botrytis fruit rot which typically appears in late February and early March.

The January rains also spread *Colletotrichum acutatum* (the anthracnose fruit rot fungus), and may even have produced some initial flower or fruit infections. Be vigilant for early signs of anthracnose disease such as blighted flowers (photo 1) or young fruit with blackened tips (photo 2). Flower blight can be caused by a number of pathogens, but black spots on young fruit are often diagnostic for anthracnose disease. If young fruit are infected in your field, don't wait until the workers begin throwing down ripe fruit with anthracnose. Modify your disease management program immediately. Some steps that can be taken include tightening the spray interval (if it is presently 10 days or more), increasing the dosage of protectant fungicide such as captan or thiram, and tank-mixing a strobilurin fungicide such as Abound (Quadris) or Cabrio with the protectant fungicide. Switch is also active against anthracnose and is a good alternative product for the strobilurins, but note the plant-back restriction if a second crop is to follow berries.

Flower blighted by *C. acutatum*

Some fields may have escaped infection at the end of January because the plants were in a "gap" period with few fruit or new flowers. Since there are often more culls than marketable fruit in these fields, harvesting is a very frustrating proposition for both the grower and the pickers. Under these circumstances, there is a temptation to lengthen the harvest interval, or "cherry pick" the field, making little effort to remove cull fruit from the plants. These fruit become a reservoir of diseases and pests, and the list of potential threats is long: anthracnose, *Botrytis*, *Rhizopus*, powdery mildew, flies, and sap beetles. Encourage workers to remove cull fruit from the plant canopy during each harvest. Good plant sanitation should pay off for any grower who wants to pick healthy fruit in March.

Young fruit spotted by *C. acutatum*

Apogee Research on Strawberries

Julia Reekie and John Duval

Apogee (Prohexadione-Ca) is a growth regulator used mainly to reduce pruning in apple trees. It is not registered for use in strawberry crops in the United States and not registered for any crop use in Canada. However, recent research has focused on its potential use in strawberry transplants. Gulf Coast Research and Education Center and Agriculture and Agri-Food Canada have been collaborating on strawberry research for the last four years, and currently there are three projects studying its use on strawberries.

When Apogee is applied to strawberry plants in Canadian nurseries, it shortens petiole length and accelerates root growth in daughter transplants. Treated plants are more compact with large roots. This mor-

(Continued on page 5)

phology may help to relieve stress during the plants' establishment in plasticulture, giving them a head start in the race to produce early fruits. Of course the timing of Apogee application is crucial to attaining the desired transplant morphology and maximizing subsequent fruit production in the southern fruiting fields. We are in our final year of testing and results so far show promise. Soon we will be able to draw conclusions and make appropriate recommendations to growers. BASF, the manufacturer of Apogee is also working hard to register the chemical in Canada.

Spotlight on Strawberry Diagnostics

Teresa Seijo, Jim Mertely, and Natalia Peres

"No news is good news." – Last season the diagnostic clinic received 33 samples in January, this season we received only five.

Three out of the five samples were infected with Powdery mildew (*Sphaerotheca macularis*). All 3 powdery mildew samples were received during the first week of January. Based on the timing of the diagnostic samples (no new samples were received after Jan. 7th) and on observations here at the GCREC farm, powdery mildew infection began to decrease as January progressed. (For more information on powdery mildew please refer to the December 2003 issue of the Strawberry-Vegetable Times at http://strawberry.ifas.ufl.edu).

No samples were diagnosed with Colletotrichum crown rot, Phytophthora crown rot, leather rot, angular leaf spot, Verticillium wilt, or sting nematodes. All of these diseases were diagnosed in Jan. 2003.

Anthracnose fruit rot caused by *Colletotrichum acutatum*, which produced such devastating losses last season, was only identified on one sample, compared to 14 samples for the same period last year. Lower initial levels of *C. acutatum* infection (as indicated by the 38% decrease in *C. acutatum* infected diagnostic samples during the beginning of this season), combined with a normal, dry December, lead to the 93% decrease in anthracnose fruit rot diagnostic samples for January. Although anthracnose has been relatively subdued this season, be vigilant. Recent rains may have spread *C. acutatum* spores, and the mild temperatures have been perfect for infection.

GCREC Welcomes Natalia Peres as the new Plant Pathologist

I have recently arrived in Dover as the new Assistant Professor for Plant Pathology, and as a native of Brazil, I am looking forward to learning all about Florida and everything it has to offer. A little background information on me will give a better indication of my skills and experience. I received my B.S., M.S., and Ph.D. from the Sao Paulo State University in Botucatu. During my Master's I worked on identifying and characterizing *Colletotrichum* species that cause anthracnose on several types of tropical fruits. My Ph.D. research focused on epidemiology and control of post-bloom fruit drop of citrus caused by *C. acutatum*, the same species that causes anthracnose disease on strawberries. I worked closely with citrus growers in Brazil and used their knowledge to develop a computer assisted system for timing of fungicide applications for control of post-bloom fruit drop. After obtaining my degree, I worked on a project funded by the University of Florida and the California Citrus Research Board on the risk of introducing exotic citrus diseases in the U.S.

I am looking forward to meeting the local growers and visiting area farms so I will be able to design my program to best fit the needs of the strawberry industry. I will be visiting some of you in the next couple of months, but in the meantime, feel free to call or stop by the center. I am looking forward to working with all of you.

OSHA Injury/Illness Summary Reports to be Posted Feb. 1

Alicia Whidden

Employers are required by OSHA to post a summary of the total number of job-related injuries and illnesses that occurred last year. Employers can use the Summary form (OSHA Form 300A) and not the OSHA 300 Log. The Summary must be posted from Feb. 1 to April 30, 2004. Agricultural establishments with 10 or fewer employees are exempt.

The summary must contain the following information:

1. The total number of job-related injuries and illnesses for 2003 that were logged on the OSHA 300 form

2. Annual average number of employees and the total hours worked for 2003 are used to calculate incidence rates.

3. If there were no recordable injuries or illnesses in 2003 you must still post the form and put zeros on the total line.

4. The summary must be certified by a company executive.

The form must be displayed in a common area where notices are posted for employees. Copies of the forms are on the web site. For more information or forms: http://www.osha.gov/.

Pesticide Registrations and Actions

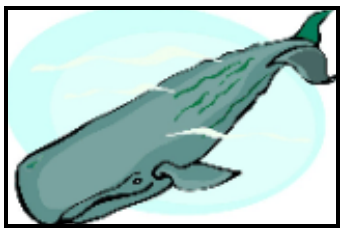
Chemically Speaking, 01/04

?? On December 22, the Florida Department of Agriculture and Consumer Service (FDACS) registered the miticide Zeal® (etoxazole) for control of spider mites on pome fruits, cotton and strawberry. The EPA registration number for the Valent U.S.A. Corporation product is 59639-123. (FDACS PREC January Agenda).

?? The nematicide DiTera® (dried fermentation products of *Myrothecium verrucaria*) is now available from Valent U.S.A. Corp. It is registered with the EPA and is also listed by the Organic Materials Review Institute for use in organically grown products. (The Grower, November-December, 2003).

?? A bill has been introduced in the U.S. House of Representatives to provide for the approval of methyl bromide critical use exemptions in the U.S. if they are not approved by the Parties to the Montreal Protocol. The following text would be added at the end of Section 604(d)(6) of the Clean Air Act (42 U.S.C.7671c(d)(6)): "In any year after the enactment of this sentence, if the Parties to the Montreal Protocol do not approve the entire amount of methyl bromide requested by the United States under the critical use exemption process as implemented by the Environmental Protection Agency pursuant to Article 2H(5) of the Protocol and Decision IX/6 of the Parties to the Protocol, then notwithstanding any other provision of this Act or any obligation incurred by the United States pursuant to the Montreal Protocol, the entire amount of methyl bromide requested shall be deemed to have been approved, and the Administrator shall issue a final rule within 30 days of a denial of the full request for United States critical use exemptions by the Parties to the Montreal Protocol to authorize production of the full amount previously determined by the Administration to constitute critical uses and to allocate this amount for each year for which such uses were requested." This amendment would allow growers and regulators to know that they will receive the methyl bromide as requested by the EPA, rather than dealing with groups that question the EPA's estimates or refuse to make a decision. (SRIPMC notification, 12/22/03).

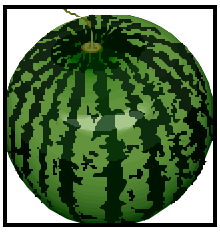
?? A group of scientists from Ocean Alliance have spent the last three years collecting fat samples from sperm whales. Using a crossbow and arrows with specially designed biopsy tips to take skin and blubber samples, the group has roughly sampled 900 of the whales. Since the whales are mammals with long life spans and large fat stores, they are believed to be good bioindicators of chemical burden. In a preliminary analysis of 30 samples, all of the samples contained residues of DDT, PCBs, chlordane, hexachlorocylohexane, and hexachlorobenzene in "small amounts". (Pesticide & Toxic Chemical News, 12/15/03).



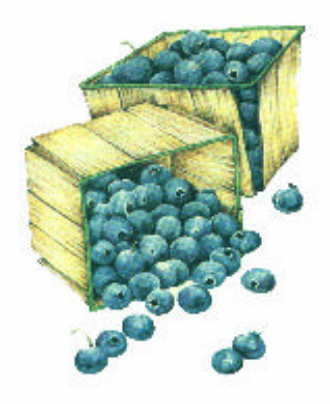
Watermelon Vine Decline and Fruit Rot Alert

Phyllis Gilreath, Manatee Co. Extension Service

For at least the past 2 seasons, central and southwest Florida have experienced problems with watermelon vine decline late in the crop cycle approaching harvest characterized by wilting in the plant, scorched leaves, defoliation and rapid vine collapse on maturing vines. Frequently, fruit were observed with greasy, necrotic lesions on the interior portion of the rind that rendered the fruit non-marketable. Investigations to date have been inconclusive for identifying a cause. No pathogen was consistently associated with the symptoms nor were any cultural or environmental factors identified as the cause. Under the leadership of Dr. Pam Roberts at Immokalee, we now have additional resources to address this problem if or when it appears this season. If you see this problem, **please** notify us immediately so we can begin collecting samples and information to try and pinpoint a cause. A significant number of melons have been lost to this problem and we need to find a solution.



The use of trade names in this publication is solely for the purpose of providing specific information. It is not a guarantee or warranty of the products names and does not signify that they are approved to the exclusion of others of suitable composition. Use pesticides safely. Read and follow directions on the manufacturer's label.



Blueberries, Peaches & Plums for West Central Florida

February 26, 2004

Hillsborough Extension
5339 S. County Road 579
Seffner, Florida
813-744-5519

9:00-9:15	Welcome and Introductions
9:15-9:45	Peaches and Plums - Varieties for west central Florida and site selection & orchard establishment- Dr. Jeff Williamson, University of Florida, Deciduous Fruit Crops.
9:45-10:30	Blueberry Varieties for west central Florida & Cultural Management-Dr. Jeff Williamson, University of Florida, Deciduous Fruit Crops.
10:30-10:45	Questions for Dr. Williamson
10:45-11:00	Break
11:00-11:30	Thrips Management for Blueberries. Dr. Oscar Liburd, University of Florida, Fruit & Vegetable IPM Specialist.
11:30-12:00	Important Blueberry Diseases of the Southeast- Dr. Barbara Smith, USDA-ARS Small Fruit Research Station. Research Plant Pathologist.

Your Cooperating Extension Faculty

Alicia Whidden- Hillsborough County Vegetable Crops, 813-744-5519, ext. 134.

Laura Miller- Hillsborough & Polk Counties, Environmental Hort/Ornamental Hort, 813-744-5519, ext. 134, 863-519-8677.

Chris Oswalt- Polk & Hillsborough Counties, Citrus, 863-519-8677, ext.108, 813-744-5519.

Phyllis Gilreath- Manatee County, Agriculture, 941-722-4524, ext.229.

1.5 CEU's and 2.5 CCA's will be available.

UNIVERSITY OF FLORIDA IFAS EXTENSION	**Please RSVP to Traci Buck at 813-744-5519 ext. 104**	Hillsborough County Florida