

Hendry County Extension, P.O. Box 68, LaBelle, FL 33975 (863) 674 4092

Flatwoods Citrus



Vol. 20, No. 4

April 2017

Dr. Mongi Zekri
Multi-County Citrus Agent, SW Florida



Table of Contents

Annual Farm Safety Day	2-6
Certified Pile Burner Class	7
Aquatic Weed Control Short Course	8
Newsletter Sponsors – Thank You!	9-12
Registration & Other Information-Certified Pile Burner Class	13-17
Foliar Feeding	18
Micronutrients in Citrus Nutrition	19-22
Citrus Canker	23-24

The Twenty-Seventh Annual Farm Safety Day

Friday, 12 May 2017
Saturday, 13 May 2017

AN IMPORTANT MESSAGE TO EMPLOYERS

Safe and competent equipment operators are important to you as an employer. Accidents, which cause damage, injury or death to employees, equipment and crops, are costly. We believe all types of accidents can be reduced with proper employee training. Our training has been designed to help your employees perform better, operate safely to prevent accidents, fulfill necessary training requirements and build pride in themselves and their farm company.

Certificates

The 2017 Southwest Florida Farm Safety Day is almost here. Farm Safety Day is an educational event designed to emphasize the importance of farm/equipment safety. Each participant is presented with a certificate of attendance and **the employer will be provided with a certificate of training that can be placed into the employee's file.**

Registration Info

The deadline for registration is Friday, April 21st, 2017. It is the employer's responsibility to assure that the employee is present at 7:30 AM on Friday, May 12th or on Saturday, May 13th at the Immokalee IFAS Center, 2685 State Rd. 29 North, Immokalee, FL 34142 to receive their nametag. Upon arrival each participant will check in at the registration table and receive a packet containing their nametag, instructions (in both English and Spanish) session handouts, an evaluation form, rodeo cap and pencil. They will be directed to their respective course sessions.

Please give us the names of those who will be attending our 27th Farm Safety Day on **Friday, 12 May or Saturday, 13 May 2017 (please select the date)**. The cost is **\$25.00** per person, which will include educational sessions, handouts, pencils, refreshments, lunch, and a cap.

Make checks payable to: SW Florida Citrus Advisory Committee

Mail registration and checks to:
University of Florida, IFAS, SWFREC
Attention: Barbara Hyman
2685 State Rd. 29 North
Immokalee, FL 34142

Or fax registration to: 239 658 3403
Deadline is Friday, April 21, 2017

Don't wait. The number of trainings offered and attendance at each training is LIMITED. For each day, class size is limited to the first 80 Spanish-speaking and 20 English-speaking people.

TWENTY SEVENTH ANNUAL SAFETY DAY

Friday, 12 May 2017
Saturday, 13 May 2017

Location: University of Florida, IFAS, SWFREC
2685 State Rd. 29 North
Immokalee, FL 34142

SCHEDULE:

7:30-8:10	Check In, Coffee, Juice, Refreshments, Door Prizes
8:10-9:00	Session 1 (Begin sessions)
9:00-9:10	Break (change session, door prizes)
9:10-10:00	Session 2
10:00-10:10	Break (change session, door prizes)
10:10-11:00	Session 3
11:00-11:10	Break (change session, door prizes)
11:10-12:00	Session 4
12:00-1:30	Lunch and Adjourn

Sessions:

1. WPS for Handlers
2. Safety Culture
3. Respiratory Protection
4. Health Hazards

The 2017 FARM SAFETY DAY REGISTRATION FORM

Please give us the names of those who will be attending our 27th Farm Safety Day on **Friday, 12 May or Saturday, 13 May 2017** at the Immokalee IFAS Center, 2685 State Rd. 29 North, Immokalee, FL 34142. The cost is **\$25.00** per person, which will include educational sessions, handouts, refreshments, lunch, and a cap.

Make checks payable to:
Citrus Advisory Committee

Mail registration and checks to:
University of Florida, IFAS, SWFREC
Attention: Barbara Hyman
2685 State Rd. 29 North
Immokalee, FL 34142

Or fax registration to: 239 658 3403
Deadline is Friday, April 21, 2017

Company Name:

Administrative Contact Person:

E-mail address:

Mailing Address:

Telephone: _____ Fax: _____ County: _____

Please list the employees who will be attending our safety training and please check their language preference*. If there is not enough space to fill in all attendants, please attach an additional sheet with the necessary information.

<u>Name</u>	<u>Friday or Saturday</u>	<u>English</u>	<u>Spanish</u>	<u>Name</u>	<u>Friday or Saturday</u>	<u>English</u>	<u>Spanish</u>
	
	
	
	
	
	
	
	
	
	

***Please Note: It is very important that we know the date (Friday, 12 May or Saturday, 13 May 2017) and the language capabilities for each attendee.**

Next to each attendee's name please mark in which language they are more fluent.
If there are any questions, please contact **Barbara Hyman (hymanb@ufl.edu) at 239 658 3400.**

Don't wait. The number of trainings offered and attendance at each training is LIMITED. Don't wait. For each day, class size is limited to the first 80 Spanish-speaking and 20 English-speaking people.

Sponsorship for the Annual Farm Safety Day



The Southwest Florida Farm Safety Day has been conducted annually since 1991. The program is strongly supported by area citrus, vegetable, sugarcane, and sod growers. Southwest Florida agricultural employers collectively send employees annually to receive training on various safety-related topics. The 2017 Annual Farm Safety Day will be held on **Friday, 12 May and Saturday, 13 May 2017** and will feature a very comprehensive farm safety program.

We ask you to consider sponsorship of the 2017 Annual Farm Safety Day to help make it a success. Any profits generated will support extension and other farm safety related programming, such as WPS training, agent in-service-training, teaching tools and related equipment, and travel for extension agents to approved conferences and meetings.

Annual expenses are estimated to be approximately \$3,000. Costs include breakfast, lunch, refreshments, handouts, hats, door prizes, and other supplies. Participants receive certificates of attendance and employers receive certificates of training that can be placed into the employee's file. The highlight of the Farm Safety Day is farm/equipment safety education.

We hope you will be able to help sponsor the 2017 Annual Farm Safety Day. We have enclosed a sponsorship form for your use. Please return the form and your sponsorship check as indicated on the form no later than April 21, 2017.

Thank you in advance for your generous support!

Dr. Mongi Zekri
Farm Safety Day Coordinator
Multi-County Citrus Agent, SWF
Hendry County Extension Office
P.O. Box 68
LaBelle, FL 33975



2017 Annual Farm Safety Day

WHEN: Friday, 12 May and Saturday, 13 May 2017

WHERE: Southwest Florida Research & Education Center, Immokalee

AUDIENCE: Anticipate 150 farm workers, managers, equipment operators, and crew leaders from the 5-county area of Southwest Florida.

COST: Sponsorships: ___ \$300 Platinum
 ___ \$200 Gold
 ___ \$100 Silver

Sponsorship goes to support awards, expenses, and other extension programs.

SPONSORSHIP REGISTRATION FORM

Business _____

Name: _____

Address: _____

City: _____ Zip Code: FL _____

Contact Person: _____

Phone: _____ Fax: _____

Check here if you are a \$300 sponsor and desire an exhibit space.

Please make checks payable to: SW Florida Citrus Advisory Committee

Mail to: **Dr. Mongi Zekri**
 Multi-County Citrus Agent
 Hendry County Extension Office
 PO Box 68
 LaBelle, FL 33975-0068

Certified pile burners class July 12, 2017

http://www.freshfromflorida.com/content/download/74623/2126893/Certified_Pile_Burner_Hendry_July12-2017.pdf

Pre-registration is required to attend, and class size is limited to the first 50 people.

Registration fee: \$50

The \$50 fee covers the training sessions, a booklet with all the presentations in color, other handouts, refreshments, and lunch.

PRE-REGISTRATION WILL NOT BE ACCEPTED WITHOUT PAYMENT OF THE REGISTRATION FEE.

Send your registration form and check as soon as possible. This class usually gets full 2-3 weeks before the event.

Location: The Immokalee IFAS Center

The Florida Division of Forestry and University of Florida Cooperative Extension Service will be conducting a Certified Pile Burners Course that will show you how to burn piles **legally, safely and efficiently.**

Most importantly, it could save a life. If you burn piles regularly, don't put off registering for this training. When the weather is dry, certified pile burners will receive priority for authorization to burn. Also, certified pile burners are allowed to burn up to two hours longer per day and get multiple day authorizations. Don't wait. The number of trainings offered and attendance at each training is LIMITED. This training will be held from 8:00 am till 4:30 pm at the **Southwest Florida Research and Education Center in Immokalee.**

Detailed information is included below and also available online:

http://www.freshfromflorida.com/content/download/74623/2126893/Certified_Pile_Burner_Hendry_July12-2017.pdf





AQUATIC WEED CONTROL SHORT COURSE

MAY 8-11, 2017
Coral Springs, Florida

Hosted by: **UF** | IFAS Extension
UNIVERSITY OF FLORIDA

The 2017 Aquatic Weed Control Short Course will be held May 8-11, 2017 at the Coral Springs Marriott.

Certification Exams and CEUs

Just getting started?

Complimentary Commercial, Public, and/or Private pesticide applicator certification testing will be offered on Thursday, May 5th after the course concludes for those looking to become licensed.

Already licensed? Earn up to 22 Florida CEUs and fully re-certify your Aquatic, Natural Areas, Right-of-Way, Forestry, or Private applicator license!



The Short Course is appropriate for new and experienced applicators alike!

Registration opens in December and sponsorship opportunities will be announced soon, so be on the lookout for future announcements! Visit the website for more short course information.

This meeting is organized by the University of Florida | IFAS Office of Conferences & Institutes (OCI).

OCI is a full service conference planning division dedicated to assisting groups that support the IFAS mission "to develop knowledge in agriculture, natural resources, and the environment, and to make that knowledge accessible to sustain and enhance the quality of human life." Check out the [OCI website](#) to learn more about other events that may interest you.

UF | IFAS
UNIVERSITY of FLORIDA

<http://conference.ifas.ufl.edu/aw/> | Registration Questions Call: 352-392-5930
Mandy Stage | Short Course Coordinator | mstage@ufl.edu

Special Thanks to sponsors of the "Flatwoods Citrus" newsletter for their generous contribution and support. If you would like to be among them, please contact me at 863 674 4092 or maz@ufl.edu



Sam Thayer
President

P.O. Box 1849
Dundee, FL 33838
Phone: (863) 439-3667
Fax: (863) 439-6608

www.maxijet.com
sam@maxijet.com

The Standard of Quality In Low-Volume Irrigation

Donald Allen
AGLIME SALES, INC.
1375 Thornburg Road
Babson Park, FL 33827-9549
Mobile: 863 287 2925
Agnnet # 52925
donald.allen@aglimesales.com

Steve Fletcher
Fletcher Flying
Service, Inc.
Phone: 239 860 2028
Fax: 863 675 3725

Scott Houk
Dow AgroSciences
13543 Troia Drive
Estero, FL 33928
Phone: 239-243-6927
SEHouk@dow.com



G.P. SOLUTIONS

We've Got You Covered From The Bottom To The Top

- Root Health Programs
- Foliar Nutrient Programs
- Disease Control Programs

Liquid Fertilizers, Micronutrients & Natural Organics

900 Cowboy Circle, Labelle, FL 33935
(863) 675-1500 | www.Nitro30.com

Ed Early
DuPont Crop Protection
P O Box 7768
Fort Myers, FL 33911
Phone: 239-994-8594
Edward.L.early@dupont.com

Cody Hoffman
syngenta[®]
Mobile: 321 436 2591
Fax: 239 479 6279
cody.hoffman@syngenta.com



**BLACKSMITH
BIOSCIENCE**

Jack Kilgore
Technical Sales Rep, SE US

Office: 7150 East Brentwood Road
Ft. Myers, FL 33919

(239) 707-7677
g8trmanjek@comcast.net
www.blacksmithbio.com

Billy Hopkins
Hopkins Nursery
239 658 0370
tropicals@wildblue.net
Tropical fruit & peach trees



AGRO SOURCE™

Bo Meador
863 673 0727
www.AgroSource.net
bo.meador@agrosource.net

NICHINO AMERICA
Scott Croxton
scroxton@nichino.net
Samuel S. Monroe
smonroe@nichino.net
www.nichino.net

Special Thanks to sponsors of the "Flatwoods Citrus" newsletter for their generous contribution and support. If you would like to be among them, please contact me at 863 674 4092 or maz@ufl.edu

Arysta LifeScience

Shan Brooks
Phone: 561-662-3558
E-mail: shan.brooks@arystacom



Eric Waldo
Yara North America, Inc.
352-215-8480
eric.waldo@yara.com



Magna-Bon®
AGRICULTURAL CONTROL SOLUTIONS

Frank Miele
Office: 863 357 0400
Cell: 954 275 1830
Fax: 863 357 1083
E-mail: famiele1@aol.com



Plant Food Systems, Inc.

P.O. Box 775
Zellwood, FL 32798
Tel: 407 889 7755



Roger Helms

roger.helms@redoxchem.com

863 382 2400

<http://www.agnutrients.com/>



Imidan
Agricultural Insecticide

Bart Hoopingarner

(941) 737-7444

bhoopingarner@gowanco.com



**PHILLIP RUCKS
CITRUS
NURSERY**

Citrus, Peaches, Windbreaks

Phone: 863 635 1948

E-mail: info@rucksnursery.com

www.ruckscitrusnursery.com

Your Best Source for Florida Land Values!



SREland.com/market-reports
877-518-LAND



Saunders
REAL ESTATE

Heath Prescott



Toll Free: 800 433 7117

Mobile: 863 781 9096

Nextel: 159*499803*6

Sarah Markle

863-673-8699

Sarah.Markle@valent.com



Wellmark



www.extinguishfireants.com

Jack Kilgore

M: 239-707-7677

g8trmanjek@comcast.net

Michael Seese
 239 336 9152
mpseese@aol.com



Infinity Ag Solutions
infinityagsolutions.com



SPECIALIZING IN LARGE ACREAGE AGRICULTURAL and TRANSITIONAL LAND



Land Solutions inc.

AGRICULTURAL
 LAND SERVICES
 More Than Just Dirt.
www.landsolutions.net
 239-489-4066

Adrian Jahna
BASF Corporation
 Cell: 863 443 2404
Adrian.jahna@basf.com

Sim Nifong



Timac AGRO
 USA

SENifong@timacusa.com
 Cell: 863 441 1057
<http://www.timacusa.com>

FMC
FMC Corporation APG
Eric Johnson
 Lakeland, FL
 352-281-2325
EJ.Johnson@FMC.Com
fmccrop.com



actagro.

Reese Martin
Reese.Martin@actagro.com
 863 605 8533
www.actagro.com



AgroFlite®

"Ultimate Precision in Aerial Application"
CUSTOM AERIAL APPLICATION
 Helicopter & Fixed-Wing Aircraft
Call for our Discounted Pricing today
(561) 600-8885
www.agroflite.com

Special Thanks to sponsors of the "Flatwoods Citrus" newsletter for their generous contribution and support. If you would like to be among them, please contact me at 863 674 4092 or maz@ufl.edu



**Institute of Food and Agricultural Sciences
UF-IFAS Hendry County Extension Service
P.O. Box 68
LaBelle, FL 33975**

Information for the next Certified Pile Burners Course:

The Florida Forest Service and University of Florida Cooperative Extension Service will be conducting a Certified Pile Burners Course on **Wednesday, July 12, 2017**. This course will show you how to burn piles *legally, safely and efficiently*. Most importantly, it could save a life. If you burn piles regularly, don't put off registering for this training. When the weather is dry, certified pile burners will receive priority for authorization to burn. Also, certified pile burners are allowed to burn up to two hours longer per day and get multiple day authorizations. Don't wait. The number of trainings offered and attendance at each training is LIMITED. This training will be held from 8:30 am till 4:30 pm at the **Southwest Florida Research and Education Center, Immokalee, Florida**. Included are a registration form and program agenda.

Registration is required to attend and class size is limited. To attend please send the following information (see form on next page):

1. Your full name (as wanted on your pile burning certificate).
2. Your mailing address (where you want the certificate mailed).
3. Your Florida Forest Service Customer Number (It is the number that you are required to give the FFS when you call in for your burn permits. If you do not know it please call the local FFS office and ask them to create one for you).
4. Your email address (if you have one) and/or contact phone number.
5. A check made out to: Hendry County 4-H for \$50.00.

The first fifty individuals to provide these five requirements will be registered; there will be a 7-day non refundable fee limit. If you do not make the training and did not contact our office at least one week before the class, you will not receive a refund. There will be a test at the end of the session. You must receive a grade of 70% or higher on the exam and demonstrate a proper pile burn with your local FFS office to become certified. Once you are certified it will be noted with your customer number, thus it is important for us to have the proper number. If you do not have a customer number, the FFS office will set one up for you. Fill out the registration form on the next page and return as directed.

Sincerely,

Mongi Zekri

For Questions Contact: Dr. Mongi Zekri at maz@ufl.edu or 239-595-5494

Registration Form

Florida's Certified Pile Burner Program
Wednesday, July 12, 2017

Hendry County Extension Office
P.O. Box 68, LaBelle, FL 33975
(863) 674-4092

**Please send this form and a check for \$50.00 made payable to:
Hendry County 4-H**

**Mail to: Hendry County Extension Office
Attn: Dr. Mongi Zekri
P. O. Box 68
LaBelle, FL 33975**

Name

Mailing address

Email address

Phone Number

Florida Forester Service Customer Number



**Florida's Certified Pile Burner Training
Wednesday, July 12, 2017**

**Location: Southwest Florida Research and Education Center
2685 State Road 29 North, Immokalee, FL 34142
(239) 658-3400**

All Times Are Local

1. Opening Comments and Introduction	08:30 – 09:10
2. Fire Weather	09:10 – 09:50
3. BREAK	09:50 – 10:00
4. Smoke Management	10:00 – 11:20
5. Open Burning Regulations	11:20 – 12:15
6. LUNCH (provided)	12:15 – 01:15
7. Planning and Implementation	01:15 – 02:30
8. Safety	02:30 – 03:10
9. BREAK	03:10 – 03:20
10. Public Relations	03:20 – 04:00
11. Wrap Up & Test	04:00 – 04:30

Please bring a Pencil for the Exam!



Location & Contact Information

**Location: Southwest Florida Research and Education Center
(Immokalee IFAS Center)**

2685 State Road 29 North, Immokalee, FL 34142 (239) 658-3400

**Contact: Dr. Mongi Zekri, Multi-County Citrus Extension Agent
Hendry County Extension Office, P.O. Box 68, LaBelle, FL 33975**

Office Phone: 863 674 4092

Cell: 239 595 5494



Florida's Certified Pile Burner Training *Frequently Asked Questions*



Q: Why should I be a certified pile burner?

A: Certified pile burners are trained to burn piles *legally, safely and efficiently*. Most importantly, it could save a life. Also, when the weather is dry, certified pile burners will receive priority for authorization to burn by the Florida Forest Service (FFS). Also, certified pile burners are allowed to burn up to two hours longer per day and get multiple day authorizations.

Q: What is a Pile Burner Customer Number?

A: When you call the FFS for an authorization to burn, you will be assigned a personal customer number. This number references your information so it doesn't need to be gathered each time you call for an authorization. You must have your individual FFS customer number in order to be certified.

Q: Is there a test?

A: Yes, the test is 20 questions and open-book. You must receive a score of at least 70% to pass.

Q: What if I don't pass?

A: Very few people fail the test but if you do, you will be provided another opportunity to take the test at a later date. If you fail the second time, you must re-register and take the training again.

Q: Why do you ask for my email on the application form?

A: Email is the fastest and most convenient method to inform registrants of their registration status. If no email address is provided then all correspondence will be sent through the federal mail. This can take several days to relay messages and this may not be practical if changes are made to the course schedule or for last minute registrations.

Q: How much does it cost to register for the training?

A: Registration for the training is \$50 per person and includes lunch, training materials and testing.

Q: How long does my certification last, and how long do I have to complete the certification from the time I finish the class?

A: As long as the person with the certification uses their number at least 5 times in a period of 5 years their certification will not expire under the current program. You **MUST** complete the certification burn within a year of taking the class.

Q: Will certified burners be notified if their certification expires?

A: Yes, notification will be sent out to them to let them know of their upcoming certification expiration date.

Q: Will I be certified at the end of the one day training?

A: No, you will need to follow the written instructions that you will receive from the FFS to become certified. You will need to complete a simple burn plan, have it reviewed and approved locally by the FFS and also have the burn itself reviewed and approved by the FFS.

Q: Is there a minimum age to be a certified pile burner?

A: Yes, you must be at least 18 years old to take the test and be a certified pile burner.

FOLIAR FEEDING

Foliar feeding is becoming very common on many horticultural crops including citrus. Economic and environmental considerations require the utilization of more efficient methods for nutrient applications.

It is usually assumed that foliar feeding refers to nutrient applications to the plants' leaves. In fact, it has been shown that all aboveground parts of a plant can absorb nutrients, including twigs, branches, buds, fruit, flowers, and stems. However, since leaves usually represent the largest surface area, they are the most important structures.

Foliar feeding is not intended to completely replace soil-applied fertilization of the macronutrients (nitrogen, potassium, and phosphorous). However, macronutrients can be foliarly applied in sufficient quantities to influence both fruit yield and quality. Some crops, such as citrus, can have a large part of the nitrogen, potassium, and phosphorous requirements met through foliar applications.

Foliar applications of other plant nutrients (calcium, magnesium, and sulfur) and micronutrients (zinc, manganese, copper, boron, and molybdenum) have proven for many crops to be an excellent means for supplying the plants' requirements. Foliar feeding should be used as an integral part of the annual nutritional program. It can be used in other situations to help plants through short, but critical periods of nutrient demand, such as fruit set and bud differentiation. Foliar nutrition may also prove to be useful at times of soil or environmentally induced nutritional shortages. Foliar application of nutrients is of significant importance when the root system is unable to keep up with crop demand or when the soil has a history of problems that inhibit normal growth.

Foliar feeding is proven to be useful under prolonged spells of wet soil conditions, dry soil conditions, calcareous soil, cold weather, or any other condition that decreases the tree's ability to take up nutrients when there is a demand. Foliar feeding may be utilized effectively when a nutritional deficiency is diagnosed.

A foliar application is the quickest method of getting the most nutrients into

plants. However, if the deficiency can be seen, the crop might have already lost some potential yield.

Foliar fertilization is also efficient since it increases the accuracy of fertilizer application. Applications made to the soil can be subject to leaching and volatilization losses and/or being tied up by soil particles in unavailable forms to citrus trees.



While foliar feeding has many advantages, it can burn plants at certain rates under certain environmental conditions. It is important, therefore, to foliar feed within the established guidelines. There are a number of conditions that can increase the chances of causing foliar burn. A plant under stress is more susceptible to damage. Stressful conditions include drying winds, disease infestations, and poor soil conditions. The environmental conditions at the time of application are also important factors. Applications when the weather is warm (above 80°F) should be avoided. This means that during warm seasons, applications should be made in the morning or evening. Additionally, applications should not be at less than two-week intervals to give the plant sufficient time to metabolize the nutrients and deal with the added osmotic stress.

Another important factor when applying nutrient foliarly is to ensure that the pH of the material is in the proper range. The pH range of the spray solution should be between 6 and 7. Attention should be paid to the pH of the final spray solution. This is significant in areas where water quality is poor.

MICRONUTRIENTS IN CITRUS NUTRITION

Iron (Fe): One of the functions of Fe is to act as a catalyst in the production of chlorophyll. Iron deficiency has been of importance on calcareous soils in certain areas of Florida where the soil contains high amount of calcium carbonate and has a pH of 8.0. Iron deficiency is attributed to low Fe content in white sandy areas near lakes and places known locally as “sand soaked areas”. Iron deficiency can be induced by high levels of P and accumulations of heavy metals, primarily Cu, in the soil. In Florida, Fe deficiency is commonly associated with Zn and Mn deficiencies.

The symptoms of Fe deficiency are also known as “iron chlorosis”. They occur on new growing leaves which are very light in color and sometimes almost white but with the veins greener than the remainder of the leaf. In acute cases, the leaves are reduced in size, very thin, and shed early. The trees die back severely on the periphery and especially in the top. Fruit set, yield, and fruit size will be reduced.



Iron deficiency is usually associated with high soil alkalinity, but it is also associated with over irrigation, prolonged spells of wet soil conditions or poor drainage and low soil temperature. Several areas affected with Fe chlorosis in south Florida have been materially helped or completely cured by careful control of irrigation and drainage. Iron deficiency

sometimes occurs where excess salts are present in the soil.

Iron deficiency has been found to be one of the most difficult deficiencies to correct especially on calcareous soils. Foliar applications of Fe are not recommended because of their lack of effectiveness and risk of leaf and fruit burn. At their best, foliar sprays of Fe produce a spotted greening of the leaves rather than an overall greening. The most reliable means of correcting Fe chlorosis in citrus is by soil application of iron chelates. Iron sulfate has not given satisfactory control on either acid or alkaline soils. Citrus rootstocks vary in their ability to absorb Fe. Trifoliate orange and its hybrids (Swingle citrumelo and Carrizo citrange) are the least able to do so.

<u>Iron Chelates</u>	<u>Effective pH Range</u>
Fe-EDTA	4 to 6.5
Fe-HEDTA	4 to 6.5
Fe-DTPA	4 to 7.5
Fe-EDDHA	4 to 9.0

Zinc (Zn): Zinc is essential for the formation of chlorophyll and function of normal photosynthesis. Zinc is also needed for the formation of auxins which are growth-promoting substances in plants.

Zinc deficiency symptoms are characterized by irregular green bands along the midrib and main veins on a background of light yellow to almost white. The relative amounts of green and yellow tissue vary from a condition of mild Zn deficiency in which there are only small yellow splotches between the larger lateral veins to a condition in which only a basal portion of the midrib is green and the remainder of the leaf is light yellow.

In less acute stages, the leaves are almost normal in size, while in very acute cases the leaves are pointed, abnormally narrow with the tendency to stand upright,

and extremely reduced in size. In mild cases, Zn deficiency symptoms appear on occasional weak twigs. Fruit formed on these weak twigs are drastically reduced in size and have an unusually smooth light-colored thin skin and very low juice content. Zinc deficiency symptoms can be so severe that they may mask or noticeably alter the symptoms of other deficiencies or disorders. Deficiency in Zn can develop due to soil depletion or formation of insoluble compounds. Excessive P or N has also been found to induce or aggravate Zn deficiency.



A spray solution containing 2 to 4 lbs of elemental Zn per acre from Zn sulfate, oxide, nitrate, chelate, phosphite or other source can correct Zn deficiency. Under severe deficiency conditions however, application of Zn sprays may be necessary on each major flush of growth to keep the trees free of deficiency symptoms because Zn does not translocate readily to successive growth flushes. Foliage injury can be reduced by adding 2 to 3 lbs of hydrated lime to the spray. Maximum benefit is obtained if spray is applied to the young growth when it is two-thirds to nearly fully expanded and before it hardens off. Treatment on the spring flush is preferable. Soil application of Zn in the fertilizer is neither an economical nor an effective way to correct Zn deficiency. One of the early diagnostic symptoms of a disorder known as young tree decline or “blight” is a Zn deficiency pattern in the leaves. Correction of the symptoms will not alleviate the disorder, and trees will never recover from the disease.

Manganese (Mn): Manganese is involved in the production of amino acids and proteins. It plays a role in photosynthesis and in the formation of chlorophyll.

Manganese deficiency occurs commonly in Florida. It is particularly evident in the spring after a cold winter. Manganese deficiency leads to a chlorosis in the interveinal tissue of leaves but the veins remain dark green. Young leaves commonly show a fine pattern or network of green veins on a lighter green background but the pattern is not so distinct as in Zn or Fe deficiencies because the leaf is greener. By the time the leaves reach full size, the pattern becomes more distinct as a band of green along the midrib and principal lateral veins with light green areas between the veins.

In more severe cases, the color of the leaf becomes dull-green. Interveinal leaf areas may develop many whitish opaque spots which give the leaf a whitish or gray appearance. The leaves are not reduced in size or changed in shape by Mn deficiency, but affected leaves prematurely fall from the tree. No particular twig symptoms have been related to Mn deficiency. In cases of acute Mn deficiency, the growth is reduced giving the tree a weak appearance.

Manganese deficiency may greatly reduce the crop and the color of the fruit. Manganese deficiency is frequently associated with Zn deficiency. This combination of the two deficiency symptoms on leaves is characterized by dark green veins with dull whitish green areas between the veins. In such combinations, the Mn deficiency is acute and the Zn deficiency is relatively mild.



In Florida, Mn deficiency occurs on both acid and alkaline soils. It is probably due to leaching in the acid soils and to insolubility in the alkaline soils. For deficient trees on alkaline soils, treatments by sprays of Mn compounds are recommended. On acid soils, Mn can be included in the fertilizer. Foliar spray application quickly clears up the pattern on young leaves but older leaves respond less rapidly and less completely. When Mn sprays are given to Mn-deficient orange trees, fruit yield, total soluble solids in the juice and pounds solids per box of fruit increase. Foliar spray of a solution containing 2 to 3 lbs of elemental Mn on two-third to fully expanded spring or summer flush leaves is recommended. If N is needed, adding 7 to 10 lbs of low biuret urea will increase Mn uptake.

Boron (B): Boron is particularly necessary where active cell division is taking place. Boron plays an important role in flowering. Florida sandy soils are low in B, and a deficiency of this element in citrus occasionally occurs under field conditions. The deficiency may be aggravated by severe drought conditions, heavy lime applications, or irrigation with alkaline water. Boron is very mobile in the soil profile of sandy soils and readily leaches by rainfall or excess irrigation.

Boron deficiency is known as “hard fruit” because the fruit is hard and dry due to lumps in the rind caused by gum impregnation. The chief fruit symptoms include premature shedding of young fruits.

Such fruit have brownish discoloration in the white portion of the rind (albedo), described as gum pockets or impregnations of the tissue with gum and unusually thick albedo. Older fruit are undersized, lumpy, mis-shapen with an unusually thick albedo containing gum deposits. Seed fails to develop and gum deposits are common around the axis of the fruit.

The first visual symptoms of B deficiency are generally the death of the terminal growing point of the main stem. Further symptoms are a slight thickening of the leaves, a tendency for the leaves to curl downward at right angles to the midrib, and sometimes chlorosis.

Young leaves show small water soaked spots or flecks becoming translucent as the leaves mature. Associated with this is a premature shedding of leaves starting in the tops of the trees and soon leaving the tops almost completely defoliated. Fruit symptoms appear to be the most constant and reliable tool for diagnostic purposes.

Borax and other B compounds are generally used in treating citrus affected with B deficiency. They can be applied either foliarly or in the fertilizer. As a maintenance program, apply B in the fertilizer at an annual rate equivalent to 1/300 of the N rate. In Florida, foliar spray applications have been found much safer and more efficient than soil application. Soil applications frequently fail to give satisfactory results during dry falls and springs and may result in toxicity problems if made during the summer rainy season. Boron solubility in the soil is reduced at soil pHs below 5 and above 7. Foliar spray may be applied during the dormant period through post bloom, but preferably during early flower development. Treating at this growth stage is important because boron does not move very readily from other parts of the tree to the buds. Applying boron at this time will assist in flower initiation and pollen production, satisfy the needs for pollen tube growth, and enhance fruit set.

For maintenance spray application, 0.25 lb/acre of B (1.25 lbs of soluble borate containing 20% B) may be used. Boron levels in the leaf tissue should not drop below 40 ppm or exceed 120 ppm (dry wt basis). Where deficiency symptoms are present, double the amount suggested. Use care not to apply more than the recommended amount because it is easy to go from deficiency to excess.

Copper (Cu): Copper also has a role in photosynthesis and chlorophyll formation. The functions of Cu in the mineral nutrition of plants are numerous. Heavy fertilization with N tends to increase the severity of Cu deficiency.

If Cu in citrus leaves falls below 4 ppm in dry matter, severe Cu deficiency will develop. In the range of 4 to 5 ppm, mild to moderate deficiency symptoms may occur. Copper deficiency rarely occurs when the Cu concentration in leaves is 6 ppm or above.



Excessive applications of nitrogenous fertilizers have been considered for years a contributing cause for this trouble giving rise to the term “ammoniation”. The cause might be an unbalanced N/Cu ratio.

The first symptom is the formation of unusually vigorous large dark green foliage with a “bowing up” of the midrib. The twigs are also unusually vigorous, long, soft, angular, frequently “S” shaped and more or less drooping.

Fruit symptoms are most pronounced on oranges. Brown stained areas of hardened gum on the rind of the fruit may precede the appearance of leaf and twig symptoms. In severe cases, dieback of young twigs will occur and the twigs will be covered by reddish brown droplets of gums.

Insufficient available Cu in the soil is believed to be the primary cause of the symptoms described. Copper deficiency is more of a problem on newly planted flatwoods land than the ridge. Prevention or cure of Cu deficiency is accomplished by either foliar sprays or soil applications of Cu compounds. A Cu spray of solution containing 2 to 3 lbs of elemental Cu applied during bloom time commonly causes an almost immediate recovery and results in a good setting of normal fruit. Copper deficiency can be a controlling factor in fruit production, and acute Cu deficiency may put trees entirely out of production. Foliage sprays are often valuable emergency treatments when symptoms of Cu deficiency are first observed.

CONCLUSION

Most micronutrient deficiencies may be recognized by visual symptoms. However, leaf analysis is helpful in verifying deficiencies particularly when non-typical symptoms or multiple nutrient deficiencies appear. Leaf analysis also provides information on low, but not yet deficient, amounts of an element so that treatment may be applied to prevent a deficiency.

For more details and more information on citrus nutrition, go to Nutrition of Florida Citrus Trees at:

<http://edis.ifas.ufl.edu/pdf/S/S/SS47800.pdf>

CITRUS CANKER,

caused by the bacterium *Xanthomonas citri* subsp. *citri*, is a leaf, fruit, and stem blemishing disease that affects most citrus. Grapefruit, Mexican lime, and some early oranges are highly susceptible to canker. Navel, Pineapple, and Hamlin oranges, as well as, lemons and limes are moderately susceptible. Mid-season oranges, Valencias, tangors, tangelos, and other tangerine hybrids are less susceptible. Tangerines are tolerant.

Major citrus canker outbreaks generally occur when new shoots are emerging or when fruit are in the early stages of development, especially if a major rainfall event occurs during this critical time. Frequent rainfall in warm weather, especially storms, contributes to disease development. Citrus canker causes defoliation, shoot die-back and fruit drop.



With endemic canker, infection starts as early as April.

Leaf susceptibility is complicated by the Asian leafminer. The galleries caused by leafminer larvae do not heal quickly and increase leaf susceptibility. This results in leaves with highly susceptible wounds for long periods of time through which the bacterium can infect the leaf.



Almost all leaf and stem infections occur within the first 6 weeks after initiation of growth unless there is a leafminer infestation. The most critical period for fruit infection is when the fruit are between 0.5-1.5 inch in diameter for grapefruit and 0.25-1.25 inch in diameter for oranges. That is the stage when the stomates on the fruit surface are opening and fruit are particularly susceptible to bacterial penetration. After petal fall, fruit remain susceptible during the first 60 to 90 days for oranges or tangerines and 120 days for grapefruit.

Management

The Citrus Health Response Plan (CHRP) does not require removal of affected trees. Thus, growers should use their best judgment in management of citrus canker. The entire state of Florida is under quarantine, and fruit movement is subject to specific regulations depending on market destination. Canker losses can be severe under Florida conditions, and can be difficult to control on grapefruit and the most susceptible early season orange varieties.

Endemic Canker. Where canker is already endemic, the primary means of control are: 1) planting of windbreaks, 2) protection of fruit and leaves with copper sprays, and 3) control of leafminer.

Windbreaks. Windbreaks are highly effective for reducing the spread of canker, but more importantly, they reduce the severity of the infection in endemic situations. The vast majority of the infection occurs by wind-blown rains that push the bacteria into tissues. Winds of 18 to 20 mph are needed to force bacteria into stomates on leaves and fruit. For more information on selection of plant species and design, see the CREC Web site (<http://www.crec.ifas.ufl.edu/extension/windbreaks/>).

No material has proven more effective than copper products. Copper products are quite effective for preventing fruit infection, but much less effective for reducing leaf infection. Application of copper to young leaves protects against infection, but it is soon lost due to rapid expansion of the surface area. Also, copper has limited value in reducing disease spread.

For oranges with endemic canker, most of the infection will occur from April to July. No more than five copper sprays applied at 21-day intervals are recommended for early processing oranges: one in early April (fruit at 0.25 to 0.5-inch stage); a second in late April, a third in mid-May, a fourth in early June and a fifth in late June to early July when the fruit is about 1.5-inch diameter. Three applications at a 21-day interval should be sufficient for Valencias and midseason varieties, in mid-April (fruit at 0.25 to 0.5-inch stage), in early/mid-May, and late May/early June. Varieties of early oranges grown for higher color score (Early Gold, Westin, Ruby, Itaborai) are more susceptible than Hamlin and may require additional sprays before April and beyond July.



The most critical period for fruit infection is when the fruit is between 0.5-1.5 inch in diameter

Navel oranges are susceptible to canker and will probably need to be sprayed every 21 days from early April to mid-July. Fallglo is relatively tolerant and probably three sprays in April, May and June should suffice. Newly planted trees in canker exposed settings are more susceptible because they produce leaf flushes more often and the flush tissue represents a high proportion of the canopy volume. The recommendation for the more susceptible varieties (grapefruit and early oranges) is that the trees be sprayed every 3 to 4 weeks to coincide with vegetative flush cycles from spring through the fall. Sprays should be applied with a hoop sprayer that thoroughly covers the foliage on all sides of the canopy.

Spray volumes for young and fruiting trees will have to be adjusted as more experience is gained. The rates of copper products depend on the length of protection expected and the weather. As little as 0.5 to 1.0 lb of metallic copper will protect spring flush growth or fruit during the dry spring season. However, in the rainy season, more than 1 lb of metallic copper may be required to protect fruit for 3-week periods.

Flatwoods Citrus

If you did not receive the *Flatwoods Citrus* newsletter and would like to be on our mailing list, please check this box and complete the information requested below.

If you wish to be removed from our mailing list, please check this box and complete the information requested below.

Please send: Dr. Mongi Zekri
Multi-County Citrus Agent
Hendry County Extension Office
P.O. Box 68
LaBelle, FL 33975

Subscriber's Name: _____

Company: _____

Address: _____

City: _____ State: _____ Zip: _____

Phone: _____

Fax: _____

E-mail: _____

Racial-Ethnic Background

American Indian or native Alaskan

Asian American

Hispanic

White, non-Hispanic

Black, non-Hispanic

Gender

Female

Male