

Citrus Notes

Polk County Extension Service

PO Box 9005, Drawer HS03 • Bartow, FL 33831-9005
(863) 519-8677, Ext. 109 • wcoswalt@ufl.edu

Hillsborough County Extension Service

5339 County Road 579 • Seffner, FL 33584-3334
(813) 744-5519, Ext. 131



Vol. 10-05



May/June 2010

Inside this Issue:

Citrus Black Spot Meeting	2
Florida Automated Weather Network (FAWN) Irrigation School	2
2010 Annual Meeting of the Florida State Horticultural Society	2 - 5
Citrus Black Spot Found in Florida	5 - 6
Citrus Leaf Analysis with Enhanced Nutritional Programs	6 - 7
Pesticide News & Information	7 - 8

Dear Growers,

By now you have heard about citrus black spot being discovered here in Florida. There will be a PolyCom presentation on May 6, 2010 and please see the information included in the newsletter. I have also provided a quick review article on citrus black spot. There will be a FAWN irrigation school held in Seffner on May 13, 2010. Don't forget to register for the Florida State Horticultural Society meeting to be held in Crystal River in June. I included some additional thoughts on citrus leaf analysis sampling if you are using an foliar nutritional program. Citrus canker can be significantly more problematic with the presence of citrus leafminer. There has been some new information on materials for leafminer control in the pesticide news and information section.

Enjoy the issue,

Chris Oswalt
Citrus Extension Agent
Polk/Hillsborough Counties
863-519-8677 Extension 108
P.O. Box 9005, Drawer HS03
Bartow, FL 33831-9005



Photo T. Spann CREC

Citrus Black Spot Meeting Scheduled

The UF/IFAS Citrus Extension Agents have scheduled a citrus black spot meeting for 10:00 a.m.

on Thursday, May 6, 2010. The meeting will be broadcasted by PolyCom to 6 locations around the state. The attached flier has the list of all the locations. For those of you not familiar with PolyCom, it is a live TV broadcast of the meeting where you have the opportunity to interact with the speaker. We have also been authorized to offer CEU's for your restricted pesticide use and certified crop advisor license for attending. If you are attending in Polk County, the PolyCom meeting will be held at UF/IFAS Citrus Research and Education Center, Ben Hill Griffin, Jr. Citrus Hall, 700 Experiment Station Road, Lake Alfred.

Florida Automated Weather Network (FAWN) Irrigation School

On May 13, 2010, the University of Florida, Florida Automated Weather Network (FAWN) will host an irrigation school at the Hillsborough Extension Service from 9 am until 1 pm, with lunch included. This seminar is free and is being funded by the Alafia River, Coastal Rivers, Hillsborough River, Manasota, Northwest Hillsborough,



Peace River, Pinellas-Anclote River, and Withlacoochee River Basin Boards, and the Southwest Florida Water Management District.

Topics covered will include urban water use, estimating evapotranspiration (ET) rates and how ET affects plant water supply, using ET-based irrigation controllers, using the FAWN Urban Irrigation Scheduler, agricultural irrigation, and citrus irrigation scheduling.

FAWN is a program of the University of Florida Institute of Food and Agricultural Science (UF/IFAS), and provides weather data and weather-related services to a wide variety of users in Florida.

The Hillsborough Extension Service is located at 5339 County Road 579 Seffner, FL, 33584.

To register contact Rick Lusher at 352-392-0429, or rlusher@ufl.edu.



2010 Annual Meeting of the Florida State Horticultural Society

The 2010 Annual meeting of the Florida State Horticultural Society will be held June 6 - 8, 2010 at the Plantation Golf Resort and Spa in Crystal River, FL. The deadline for hotel reservations at the FSHS rate is May 6, 2010. Meeting and hotel registration information can be found at the "Society's" web site:

<http://www.fshs.org/meetings.htm>.



The following are titles from submissions to the citrus section of the program:

Modeling Loosening of Sweet Orange with CMNP: Variation in Fruit Detachment Force. *S. Sharma, R.C. Ebel, and K.M. Morgan, UF/IFAS South West Florida Research and Education Center, Immokalee, FL.*

Induction of Autotetraploids in Pummelo (Citrus grandis) Through Colchicine Treatment of Meristematically Active Seeds In Vitro. *Divya Kainth and J. Grosser, UF/IFAS Citrus Research and Education Center, Lake Alfred, FL.*

Spatial Variability of Leaf Wetness Duration in Citrus Canopies. *V. Santillan and C. Fraisse, UF/IFAS Agricultural and Biological Engineering Department, Gainesville, FL.*

Variation in Florida Processing Orange Yields over the Past 46 years: A Standardized Evaluation. *L. Gene Albrigo and M. Burani-Arouca, UF/IFAS, Citrus Research and Education Center, Lake Alfred, FL.*

Resolving the Current Challenges to Lime Production in Oman. *Al-Yahyai, R., F. Al-Said, A. Al-Sadi, A. Al-Wahaibi, M. Deadman, Department of Crop Sciences, Sultan Qaboos University, Muscat, Oman, I. Khan, Vice Chancellor's Office, University of Agriculture, Faisalabad, Pakistan, M. Al-Wardi, S. Al-Ismaily, Department of Soil, Water & Ag. Eng., Sultan Qaboos University, Muscat, Oman, A. Al-Lawati, A. Al-Matrooshi, A. Al-Zidjali, Directorate General of Agriculture & livestock Research, Ministry of Agriculture, Muscat, Oman.*

Interaction of CMNP Application and Harvest Date of "Hamlin" Sweet Orange. *Robert C. Ebel, UF/IFAS South West Florida Research and Education Center, Immokalee,*

FL; J.K. Burns, UF/IFAS Citrus Research and Education Center, Lake Alfred, FL; K.M. Morgan, and F. Roka, UF/IFAS, SWFREC, Immokalee, FL.

Citrus Stumps Sprout Control. *Steve H. Futch, UF/IFAS, Citrus Research and Education Center, Lake Alfred, FL, and S. Weingarten, Orange Co., Arcadia, FL.*

Alion 200SC – A Promising New Herbicide for Weed Management in Florida Citrus. *Steve H. Futch, UF/IFAS, Citrus Research and Extension Center, Lake Alfred, FL; M. Edenfield and J. Curtis, Bayer CropSciences, Morriston, FL.*

Estimating Relative Nutrient Uptake by Mature Citrus Trees in Field Conditions. *K. Mann, A. Schumann, L. Waldo, K. Hostler, and R. Mann, UF/IFAS, Citrus Research and Education Center, Lake Alfred, FL.*

Phosphite is not a Good Source of Phosphorus for Citrus Rootstock Seedlings. *F.C.B. Zambrosi, F.C.B., Instituto Agronômico, Campinas, San Paolo, Brazil; D. Mattos Júnior and J.P. Syvertsen, UF/IFAS, Citrus Research and Education Center, Lake Alfred, FL.*

Rootstocks for "Parson Brown" Sweet Orange. *William S. Castle and J.C. Baldwin, UF/IFAS Citrus Research and Education Center, Lake Alfred, FL.*

Impact of Inflation on the U.S. Orange Juice Tariff and the Competitiveness of Florida Growers and Processors. *R.A. Morris, UF/IFAS Citrus Research and Education Center, Lake Alfred, FL.*

Effect of Salicylic Acid on Oxidative Metabolism During Xac Infection of Grapefruit. *N. Kumar, R.C. Ebel, and P.D. Roberts,*

UF/IFAS South West Florida Research and Education Center, Immokalee, FL.

Copper Formulations and Duration of Activity for Control of Citrus Canker on Grapefruit. *J. Graham, M. Dewdney, and M. Myers, UF/IFAS Citrus Research and Education Center, Lake Alfred, FL.*

Screening Program for Products that are Reported to Stimulate Systemic Acquired Resistance Against Bacterial Canker. *R.C. Ebel, N. Kumar, and P. Roberts, UF/IFAS South West Florida Research and Education Center, Immokalee, FL.*

Broad Spectrum Insect Control with MOVENTO® (Spirotetramat) in Florida Citrus. *M. Edenfield, R. Morris, and J. Bell, Bayer CropScience, RTP, North Carolina.*

Effect of Stimplex® Crop Biostimulant on Drought Tolerance of Container-grown “Hamlin” Sweet Orange Trees. *Timothy M. Spann, UF/IFAS Citrus Research and Education Center, Lake Alfred, FL and Holly A. Little, Acadian Agritech, Sacramento, CA.*

A Comparison of Common and Different Volatiles in “White” Guava and “Hamlin” Orange Leaves. *E. Onagbola, J. Smoot, L. Stelinski and R. Rouseff, UF/IFAS Citrus Research and Education Center, Lake Alfred, FL.*

Ground Application of Foliar Sprays of Insecticides on 'Valencia' Oranges to Control *Diaphorina citri* Kuwayama. *J.A. Qureshi, J.A., B. C. Kostyk, and P. A. Stansly, UF/IFAS South West Florida Research and Education Center, Immokalee, FL.*

Possible Resistance to Huanglongbing in Sweet Orange. *R.H. Brlansky. and W.S. Cas-tle, UF/IFAS Citrus Research and Education*

Center, Lake Alfred, FL; S. B. Garrett Citrus Grower, Haines City, FL.

HLB/ACP Resistance or Tolerance in Non-transgenic Citrus Scion Varieties: Potential Commercial Significance? *E. Stover, G. McCollum, B. Shatters, D. Hall, and Y. Duan, USDA/ARS USHRL, Ft. Pierce, FL.*

Managing Huanglongbing (Citrus Greening) with Foliar-applied Nutrient Sprays and SAR Inducers: Guiding Principles. *T.M. Spann and A.W. Schumann, UF/IFAS Citrus Research and Education Center, Lake Alfred, FL.; K.T. Morgan and R.E. Rouse, UF/IFAS South West Florida Research and Education Center, Immokalee, FL.*

Monitoring Trees in a Commercial Grove with HLB in Southwest Florida Receiving a Nutritional/SAR Cocktail. *R.E. Rouse, UF/IFAS South West Florida Research and Education Center, Immokalee, FL; M. Irey, U.S. Sugar Corporation, Southern Gardens Citrus Corp., FL; P.D. Roberts, UF/IFAS, SWFREC, Immokalee, FL, M.M. Boyd and T.D. Willis, McKinnon Corporation, Immokalee, FL.*

Observations Gleaned from the Testing at the Southern Gardens HLB Diagnostic Laboratory: Three Years and 150,000 Samples Later. *Irey, M.S., J. Johnson, P. Gadea, and T. Gast, United States Sugar Corporation, Southern Gardens Citrus Corporation, FL, and J. H. Graham and O. Cutino, UF/IFAS, CREC, Lake Alfred, FL.*

Optical Methods for Huanglongbing (HLB) Detection in Citrus Orchards. *S. Sankaran and R. Ehsani, UF/IFAS Citrus Research and Extension Center, Lake Alfred, FL.*

You can find completed abstracts for all the above plus other meeting presentations at the FSHS website:

<http://www.fshs.org/Meetings/2010/FSHS-2010-Abstracts-April200.pdf>.

Citrus Black Spot Found in Florida

I delayed the release of last month's issue of "Citrus Notes" so I could get you the latest information on the recent discovery of citrus black spot in South Florida. Unfortunately, I did not receive confirmation until after the newsletter was sent out. The initial information I received was that this disease was first seen in a South Florida grove the week of March 22, 2010. Upon a visual diagnosis it was determined symptomatically as citrus black spot. Samples were taken for laboratory testing to definitively determine if this was the causal organism called citrus black spot. During the week of March 29, 2010, a second sample was taken for independent confirmation of citrus black spot. Based upon initial and secondary confirmation it was determined that this was indeed citrus black spot. Our latest information is that the disease is presently limited to a 15 square mile area south of Immokalee. Surveys are continuing in the surrounding area, associated groves and along major trucking routes for signs of the disease.

Citrus black spot has been found in a number of continents including Southeast Asia, Africa, South America and Australia. It is considered one of the most important citrus fungal diseases in the world. The symptoms of citrus black spot are necrotic lesions mainly on fruit and on foliage with a severe infection. Lesions occurring on the fruit render the fruit unacceptable for the fresh citrus market. Furthermore these lesions occurring on citrus fruit can cause extensive fruit drop and yield reduction.



Citrus black spot is caused by the fungus *Guignardia citricarpa*. Most all varieties of citrus are susceptible to some degree to black spot. Mandarins, grapefruit, lemon, limes and Valencias are especially susceptible, although Tahiti lime and sour orange are not susceptible.

Citrus black spot appears as conspicuous black lesions on the rind of citrus fruit. These symptoms are quite variable and are grouped into 3 types based on the expression of symptoms. These types include hard spot lesions, virulent spots and speckled blotch or false melanose spots on fruit. Environmental conditions at the time of fruit maturity of high temperature, high light intensity and stress affect the intensity of symptom expression. Symptoms generally become visible as the



fruit mature, so it is difficult to detect until the fruit break color.

Black spot infection is very similar to that of greasy spot in Florida. Warm wet conditions found during the summer with an abundance of inoculum and susceptible fruit all significantly contribute to infection. Like with greasy spot, ascospores are produced on dead infected leaves that have fallen to the ground. During periods of rainfall or irrigation, these ascospores are ejected into the air causing infection in the late spring and summer. Fruit remain susceptible to infection for 4 to 5 months after petal fall. The fungus has a long period of latency when infected young fruit may not exhibit symptoms until the fruit approaches maturity.

In the field citrus black spot can be diagnosed by the presence of fruit lesions and associated fruit drop. Since citrus black spot has not previously been found in Florida the following information on control comes from other countries where black spot is endemic. In these countries, properly timed protective fungicide applications using copper or strobilurins are required during the period of susceptibility.



Citrus Leaf Analysis with Enhanced Nutritional Programs

It has become evident, after having conversations with growers in the area, that many of you have adopted an enhance nutritional program to support overall citrus tree health. Considering this information you should be aware of some

precautions when pulling citrus leaf samples for nutritional analysis.

First, check with the lab that does your leaf analysis and inquire about their surface decontamination process. If you have recently applied a foliar nutritional product make sure the lab routinely and thoroughly washes leaf samples before running an analysis. Your goal should be to measure the amount of nutrition in the leaf not on the leaf.

Second, try to schedule your collection of leaves for nutritional analysis long after a previously applied nutritional spray. If possible try to schedule your foliar nutrient application right after you have collected your leaf samples.

Third, remember to only sample 4 to 6 month old **healthy** spring flush leaves from non-fruiting twigs. This includes the exclusion of leaves with canker lesions and greening symptomatic leaves. Otherwise the sampling procedures are as follows:

The optimum time to take leaf samples would be when the spring flush is 4 to 6 months old (July/August). Samples should be composed of one hundred of these 4 to 6 month old spring flush leaves from non-fruiting twigs under the same designated management area. These 100 leaves can be taken from the same 15 to 20 trees used for soil sampling and analysis. Leaves should be insect and disease free, mature, hardened-off and only one leaf per shoot taking care to include the leaf petiole. These leaves should then be placed in a clean paper bag with a unique identification number of your choosing. Samples should not be allowed to dry out or be exposed to extreme heat. Leaves that are to be stored overnight need to be placed in a refrigerator. For macro-nutrient analysis leaves do not need to be washed. For accurate micro-nutrient analysis leaves need to be surface washed with a

mild detergent shortly after collection (or ask your lab about sample perpetration). Leaves sprayed with micro-nutrients, specifically copper, manganese or zinc, should not be analyzed for these nutrients since surface washing will not remove these spray residues. Unlike soil analysis, leaf analysis will be reported in total nutrient concentration. The measurement of total nutrient concentration is universal and direct comparisons can be made between different labs.

The University of Florida's recommendations for citrus leaf nutrient levels are reported in concentration either as percent nutrient for macro-nutrients or in parts per million for micro-nutrients. The interpretation of these nutrient levels range from deficient to excess. The goal of citrus leaf sampling and analysis is to maintain leaf nutrient concentration in the optimum range.

Table 4.2. Guidelines for interpretation of orange tree leaf analysis based on 4 to 6-month-old spring flush leaves from non-fruiting twigs (Koo et al., 1984).

Element	Unit of measure	Deficient	Low	Optimum	High	Excess
N	%	< 2.2	2.2 - 2.4	2.5 - 2.7	2.8 - 3.0	> 3.0
P	%	< 0.09	0.09 - 0.11	0.12 - 0.16	0.17 - 0.30	> 0.30
K	%	< 0.7	0.7 - 1.1	1.2 - 1.7	1.8 - 2.4	> 2.4
Ca	%	< 1.5	1.5 - 2.9	3.0 - 4.9	5.0 - 7.0	> 7.0
Mg	%	< 0.20	0.20 - 0.29	0.30 - 0.49	0.50 - 0.70	> 0.70
Cl	%	---	---	< 0.2	0.20 - 0.70	> 0.70 ¹
Na	%	---	---	---	0.15 - 0.25	> 0.25
Mn	mg/kg or ppm ²	< 18	18 - 24	25 - 100	101 - 300	> 300
Zn	mg/kg or ppm	< 18	18 - 24	25 - 100	101 - 300	> 300
Cu	mg/kg or ppm	< 3	3 - 4	5 - 16	17 - 20	> 20
Fe	mg/kg or ppm	< 35	35 - 59	60 - 120	121 - 200	> 200
B	mg/kg or ppm	< 20	20 - 35	36 - 100	101 - 200	> 200
Mo	mg/kg or ppm	< 0.05	0.06 - 0.09	0.10 - 2.0	2.0 - 5.0	> 5.0

¹Leaf burn and defoliation can occur at Cl concentration > 1.0%.
²ppm = parts per million.

The above table presented in this article is from Nutrition of Florida Citrus Trees”, UF/IFAS, SL 253, 2nd Ed, Drs. Thomas Obreza and Kelly Morgan. A limited number of copies are available from our office in Bartow.

Pesticide News and Information



SPLAT® CLM

The FDACS has been working to expedite the registration of an insect pheromone (SPLAT® CLM), a straight-chain lepidopteran pheromone product for the control of citrus leafminer in citrus. Florida's citrus industry has expressed the importance of the availability of this product for control of this pest this season, especially given its demonstrated impact on the incidence of citrus canker. The receipt of the application for registration of this new active ingredient product was published near the end of January in the *Federal Register*. Comments are due by April 13, 2010. (FDACS email, 3/18/10).

Intrepid® Insecticide

A couple of months back (March 2010) I included an update in this section on a new material from Dow AgroSciences labeled for citrus leafminer, citrus orange dog and other lepidopterous larvae control called Intrepid®. I wanted to share some additional information on the material and its potential use for citrus leafminer control especially in blocks with citrus canker. Intrepid® is not currently listed in the 2010 Florida Citrus Pest Management Guide due to the fact that the special local needs (SLN) registration was not completed until after the guide was printed.

Intrepid® is what is called a molt accelerating compound (MAC) insecticide. It is an insect growth regulator (IGR) affecting the molting process of immature insects. The insecticide causes the molting process to occur earlier than normal resulting in insect starvation. The Insecticide Resistance Action Committee (IRAC) mode of action class is group 18.

Intrepid® is only ingested by the insect, has no contact or systematic activity and is trans-laminar into the leaf for residual insect control. It has no effect on bees and can be used

during bloom. Intrepid® also does not appear to be harmful to most beneficial insects.

In Florida citrus it is recommended (from Dow AgroSciences) that no more than 3 applications per year be made at a rate of 8 ounces per acre per application. Applications should be made in a minimum of 50 gallons of water per acre and the insecticide is rain fast in 4 to 6 hours. No more than 2 consecutive applications should be made with at least a 14 day interval between these applications. Intrepid® is compatible with spray oil, but the addition of oil is not necessary. It has a 4 hour restricted entry interval (REI) and a post harvest interval (PHI) of 1 day. Initial applications should be made at the first observance of pests on the flushing leaves.

Citrus Extension Agents Host

Citrus Black Spot Workshop

“Citrus Black Spot – The Disease and Identification”

Thursday May 6, 2010
10:00 a.m. to Noon

Locations:

Presentation will be broadcast simultaneously via PolyCom to each of the following locations on Thursday, May 6, 2010 beginning at 10 AM. Presentations followed by questions and answers. Black spot identification materials will be available at the meeting.

City	Location	Address	Location Phone
Arcadia	DeSoto County Extension Service	2150 NE Roan Street	863-993-4846
Dade City	Pasco County Extension Service Office	36702 SR 52	352-521-4288
Ft. Pierce	Indian River REC*	2199 S. Rock Road	772-468-3922
Immokalee	Southwest Florida REC*	2685 SR 29 N	239-658-3400
Lake Alfred	Citrus REC*	700 Experiment Station Road	863-956-1151
Sebring	Bert J. Harris Agricultural Center	4509 George Boulevard	863-402-6540

*REC = Research & Education Center

Presenter: Dr. Megan Dewdney, Plant Pathologist
Citrus Research & Education Center
Lake Alfred, Florida

Questions can be directed to any of the citrus extension agents:

Ryan Attwood – 352-343-4101

Gary England – 352-793-2728

Steve Futch – 863-956-1151

Tim Gaver – 772-462-1660

Tim Hurner - 863-402-6540

Chris Oswald – 863-519-8677 ext 108

Mongi Zekri – 863-674-4092