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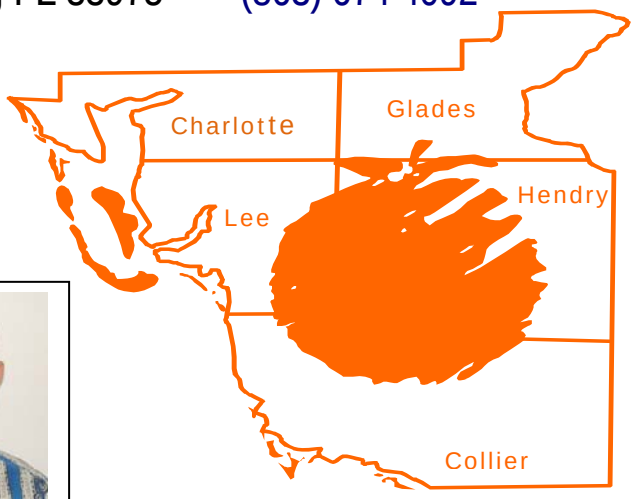
IFAS Extension

EXTENSION

Institute of Food and Agricultural Sciences

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

Flatwoods Citrus



Vol. 15, No. 11 **November 2012**

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

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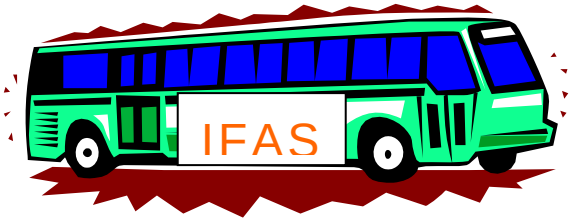
Previous issues of the Flatwoods Citrus newsletter can be found at:
http://citrusagents.ifas.ufl.edu/agents/zekri/index.htm
http://irrec.ifas.ufl.edu/flcitrus/

Please take a moment to fill out the survey on page 21 and to rate the quality and usefulness of the information presented in the Flatwoods Citrus newsletter on page 22.

I M P O R T A N T E V E N T S

HENDRY COUNTY EXTENSION AG TOURS



Saturday, 1 December 2012
Saturday, 2 February 2013
Saturday, 9 March 2013
For more information or to sign up,
call Debra at 863 674 4092

Citrus Research Field Day

December 13, 2012
Pre-registration required
For more details and registration, call Jane Wilson at 863 956 8643

Getting prepared for freezes

Immokalee IFAS Center, Tuesday, January 8th, 2013

1. **Winter weather watch for citrus growers**
2. **Climate, cold hardiness and freeze protection**
3. **FAWN and FAWN tools for freeze protection**

The Florida Citrus Show in Fort Pierce, January 23-24 2013

Havert L. Fenn Center, Ft. Pierce, FL
For more information and registration, go to: http://www.citrusshow.com/

3rd International Research Conference on HLB

February 4-8, 2013, Caribe Royale Orlando All-Suites Hotel and Convention Center. **For more information, visit http://irchlb.org**

ANNUAL FLORIDA CITRUS GROWERS' INSTITUTE

Date & Time: Tuesday, 2 April 2013, 8:00 AM – 3:30 PM
Location: Avon Park Campus of South Florida Community College

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

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

Heath Prescott
KeyPlex®
Toll Free: 800 433 7117
Mobile: 863 781 9096
Nextel: 159*499803*6

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

FIRST BANK
P.O. Box 697
LaBelle, FL 33975
LaBelle Phone: 863 675 4242
Fax: 863 675 1099
Moore Haven: 863 946 1515

Ed Early
DuPont Ag. Products
5100 S. Cleveland Ave.,
Suite 318-368
Fort Myers, FL 33907
Phone: 239 994 8594
Edward.L.Early@USA.dupont.com

Cody Hoffman
SYNGENTA
1505 Paloma Dr., Fort Myers, FL 33901
Mobile: 321 436 2591
Fax: 239 479 6279
cody.hoffman@syngenta.com

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SOUTH FLORIDA WATER MANAGEMENT DISTRICT

2012 WATER WATCH

Keeping an Eye on Water Resources

District-Wide Conditions for October 29, 2012

The South Florida Water Management District (SFWMD) is issuing the following briefing:

The District-wide rainfall total associated with Hurricane Sandy was approximately 0.79 inches, with local maximums of more than 3 inches in several basins in Broward and Miami-Dade counties. With no significant rainfall forecast in the next few days, water managers have returned canals to seasonally appropriate levels.

This week, seasonally high tides amplified by the storm and a full moon are significantly impacting coastal regions and some inland areas connected to east coast estuaries. Tidal water levels were two feet higher than during Tropical Storm Isaac. Many of these areas are outside the control of the District's water management structures, and District operations have no impact on the coastal high water levels.

The District continues to monitor water levels and operate the system to maintain flood control while capturing as much water as possible for the upcoming dry season. For more information on the rainy season and other water updates, visit:

- Flood and Rainy Season Readiness
- SFWMD Weather/Rainfall Data
- Climate Prediction Center Precipitation Forecast

Lake Okeechobee Levels

Today	**15.91** feet
Historical Average for Today	**15.03** feet
This Date One Year Ago	**13.20** feet
One Month Ago	**15.51** feet
One Week Ago	**15.90** feet

Water Levels in Key Locations

LOCATION	CURRENT WATER LEVEL	ONE MONTH AGO	HISTORICAL AVERAGE FOR TODAY
Lake Istokpoga	**39.36** feet	**38.87** feet	**39.28** feet
WCA-1	**17.30** feet	**17.05** feet	**16.47** feet
WCA-2	**13.52** feet	**13.78** feet	**13.23** feet
WCA-3	**11.41** feet	**11.33** feet	**10.60** feet
Lake Kissimmee	**51.58** feet	**51.46** feet	**51.31** feet
For a map of wet season rainfall totals in all District basins, click here.			

Other Actions

Navigation

- All Kissimmee River navigation locks are open.
- The S-193 Lock, located on Taylor Creek on the north shore of Lake Okeechobee, is closed due to ongoing renovation work to refurbish the lock and ensure decades of reliable service.
- Lock operations have resumed at the S-310 Lock, located near Clewiston on the south shore of the lake. Boaters must now "lock through" to navigate between the lake and the Clewiston Canal.

Water Conservation Measures

- South Florida is under the District's Year-Round Landscape Irrigation Rule that limits residential and business landscape irrigation to two or three days per week based on location.
  - To determine watering days and times in your area, contact your local government or visit www.sfwmd.gov/2days.
- Permitted water users such as nurseries, agriculture, golf courses and utilities should continue following the water use conditions in their permits.
  - Permit details can be found in the Application/Permit records search online at www.sfwmd.gov/ePermitting.
- For information about water conservation, visit www.savewaterfl.com.

# # #

Media inquiries can be directed to:
Randy Smith
South Florida Water Management District
Office: (561) 682-2800 or Cellular: (561) 389-3386

If you have not filled out the survey on page 21 and rated the quality and usefulness of the information presented in the Flatwoods Citrus newsletter on page 22, please do so.

SOUTH FLORIDA WATER MANAGEMENT DISTRICT

NEWS RELEASE

November 1, 2012

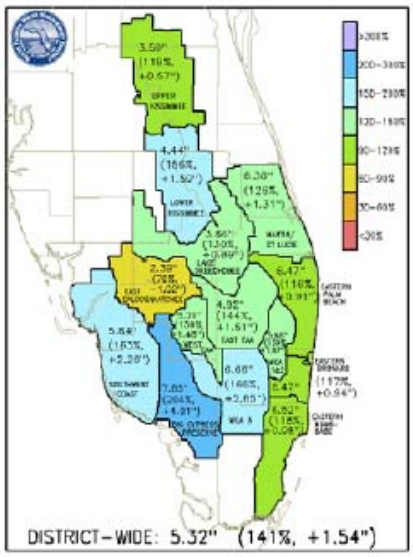
CONTACT:
Gabe Margasak
South Florida Water Management District
Office: (561) 682-2800 or Cellular: (561) 670-1245

www.sfwmd.gov/news
follow us on twitter

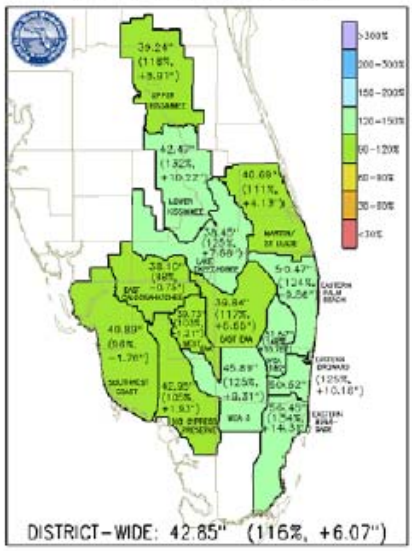
Dry Season Starts Following a Wet October

Water levels are currently adequate to meet water supply needs into the dry season

October 2012 Rainfall



2012 Wet Season Totals



(Click on the graphics for larger versions.)

West Palm Beach, FL – South Florida transitioned into the dry season during the last days of October, a month that ended with above average rainfall across most of the South Florida Water Management District's (SFWMD) 16-county region.

"The region is well positioned for the dry season because water levels are up," said Susan Sylvester, SFWMD Chief of the Water Control Operations Bureau. "Looking ahead, we have a forecast of average rainfall for the next few months."

October Rainfall

District-wide October rainfall averaged 5.32 inches from Orlando to the Florida Keys, representing 141 percent of average, or 1.54 inches above average. Most areas of the District saw above average rainfall. Highlights of the month include:

- Broward County, the Southwest Coast and Martin and St. Lucie counties experienced some of the highest rainfall totals.
- The Water Conservation Areas saw significant rainfall as did the Big Cypress Preserve.
- The East Caloosahatchee Basin was the only area of the District to receive below average rainfall, with 2.39 inches, representing 70 percent of average, or a deficit of 1.02 inches.
- Lake Okeechobee received 3.86 inches of direct rainfall, representing 130 percent of average, or 0.89 inches above average.

2012 Wet Season Totals

The 2012 wet season ended with 42.85 inches of rainfall District-wide. This represents 116 percent of average, or 6.07 inches above average.

Above average rainfall was driven by the early start to the wet season in May and the historic deluge from Tropical Storm Isaac in late August. Among the wet season highlights:

- Eastern Miami Dade, Broward and Palm Beach counties received the most rainfall in the District, with more than 50 inches of rain for the wet season.
- The Southwest Coast and East Caloosahatchee Basin were the only areas of the District that were slightly below average.
- Lake Okeechobee received 38.45 inches of direct rainfall, representing 125 percent of average, or 7.58 inches above average.
- During Isaac, the District moved 105 billion gallons of water to tide and storage areas following 14.85 inches of rainfall in a 72-hour period in an area of central Palm Beach County.

2012-2013 Dry Season Forecast

South Florida is forecast to experience one of the few dry seasons having near-average rainfall in the past 14 years. Only two dry seasons, 1998-1999 and 2003-2004, have actually been about the historical average in that timeframe, with two above average and 10 below average dry seasons. The National Oceanic and Atmospheric Administration's Climate Prediction Center forecast calls for equal chances of slightly above or slightly below average rainfall for the first three months of the upcoming dry season.

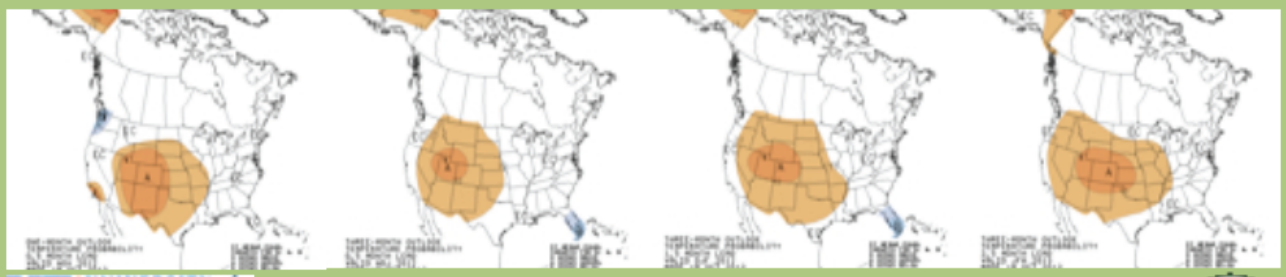
Just the Facts:
South Florida's Dry Season

- *November – May*
- *About 18 inches of rain is the average*
- *May and October are important transition months*
- *March, April and May have the highest evaporation rates and lowest rainfall*

Among the official forecast highlights for the 2012-2013 South Florida dry season:

- Near normal precipitation is mostly likely during the first part of the dry season, from November to February
- A drier-than-normal trend may characterize March and April

Winter Weather Watch



UF UNIVERSITY of FLORIDA
IFAS Extension
Polk County Extension

Polk County Cooperative Extension Service
Phone: 863-519-8677
Email: wcoswalt@ufl.edu

UF/IFAS Polk County Cooperative Extension Service

The 2012-13 version of the Winter Weather Watch will begin on Thursday, November 15, 2012. Time is short so send in your subscription form to receive timely agricultural winter weather forecasts and information.

The 2012-13 edition of the Polk County Winter Weather Watch program will begin on November 15, 2012. The program provides growers with winter weather forecast information specifically geared toward agricultural interests in West Central and Southwest Florida. The program provides subscribers with an unlisted phone number for (24 hour/7 days a week) access to daily weather forecasts. The zone forecasts are from the National Weather Service (NWS) and are listed on the automated phone menu, so you can select the products you are interested in. Forecasts include the zone forecasts, 6-10 and 8-14 day outlook forecasts. In addition to the forecasts we have special weather narratives provided as needed in the event of freezing temperatures and a weekly outlook. When freezing temperatures are predicted in our area additional updates will include the afternoon zone forecast and the modified sunset brunt minimum temperature equation. If this is not enough we will also provide the weekly citrus leaf freezing temperatures and the 2012-13 Winter Weather Watch manual.

Subscriptions for the Winter Weather Watch program are only $100.00 for the entire 4 month period (Nov 15 to Mar 15). The cost is about the same as one tank of gas for your pickup truck. You can subscribe to the Winter Weather Watch by completing and returning the enclosed "subscription form".

Forecast Schedule

The following schedule lists the products available from the Winter Weather Watch. The times and specific days of week and the forecasted minimum temperature dictate when these forecasts products will be updated. Our Winter Weather Watch area includes the following areas by county: Pasco, Hillsborough, Polk, Highlands, Hardee, Manatee, Sarasota, DeSoto, Charlotte, Lee, Glades, Hendry and Inland Collier Counties.

2012 – 2013 WINTER WEATHER WATCH PROGRAM

NOVEMBER 15, 2012 TO MARCH 15, 2013
REGISTRATION FEE: $100.00

It's once again time to register for the upcoming 2012 - 2013 Winter Weather Watch Program. Upon receiving your $100.00 registration payment, you will be sent an unlisted telephone number with which you can retrieve the latest **Ag Forecasts**, 24 hours a day. **Please do not give this number to others**. The *Winter Weather Watch Program* is funded by the registration fees to pay for telephone equipment rentals, long distance calls, repairs and our meteorologist.

2012 – 2013 Winter Weather Watch Program

NAME:_____ PHONE NUMBER:_____

COMPANY:_____

MAILING ADDRESS:_____

EMAIL ADDRESS:_____

CITY:_____ZIP CODE:_____

REGISTRATION FEE $100.00

PLEASE RETURN THIS REGISTRATION FORM AND YOUR CHECK PAYABLE TO:

POLK COUNTY CITRUS ADVISORY COMMITTEE
PO BOX 9005, DRAWER HS03
BARTOW, FL 33831-9005

SECC Fall Climate Outlook

Date updated: October 15th, 2012

DOWNLOAD PDF

El Niño fails to materialize in the Pacific Ocean

Following two consecutive years of La Niña (colder than normal sea surface temperatures along the equator in the eastern and central Pacific), ocean temperatures began to warm over the summer and approached El Niño thresholds in July and August. At that time, many modeling centers and NOAA were predicting that waters would continue to warm and El Niño would continue to build and impact our fall, winter, and spring climate patterns.

In the last few weeks, however, ocean temperatures have cooled in the eastern and central Pacific and there are no significant warm anomalies anywhere to be found. Atmospheric indicators also fail to show any signs of El Niño, including the SOI actually turning positive in September (strong negative values are indicative of El Niño). Most importantly, it takes disruptions in the trade winds in the central and western Pacific (westerly anomalies) to cause the downwelling Kelvin waves that travel east and reinforce a building El Niño. We have not seen any such wind anomalies in months.

Climate Outlook

Neutral Pacific means more variable weather patterns over the Southeast. With Neutral conditions firmly in place in the tropical Pacific Ocean, there is no indication that temperatures or rainfall will be either above normal or below normal. More variable weather is common in neutral winters, with periods of very cold weather mixed in with warm spells.

Near-normal rainfall is the best forecast, as there is no El Niño or La Niña to tip the balance towards wetter or drier than normal. Keep in mind that winter is the critical recharge period for surface and groundwater in Alabama, Georgia, and the Carolina's. The good coverage and slow soaking nature of winter rainfall that is cause by fronts and low pressure systems is much more effective at refilling rivers, lakes, reservoirs, and aquifers than the scattered summer thundershowers. In addition, the colder temperatures and mostly dormant vegetation result in much less loss to evapotranspiration. Normal or above normal rainfall during the coming season is critical to easing the prolonged drought conditions these states have experienced.

For more detailed information on climate impacts in the Southeast, see the Climate Risk tool: **Climate Risk Tool**.

Severe freezes that can impact citrus and other winter crops are more likely this year. Studies have shown that of the dozen or so catastrophic freezes that have impacted the Florida citrus industry since the late 1800's, nearly all of them have occurred during times of Neutral conditions in the Pacific. We believe that the predominant jet stream patterns set up by El Niña and La Niña tend to "block" the major intrusions of Arctic air masses that cause these severe freezes. With neither in place this season, the jet streams are more susceptible to the dramatic dips, or "troughs" that can allow these air masses further south. For more information, see our **winter freeze forecast**.

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IFAS Extension

Citrus Health Management Areas (CHMA's): Developing a psyllid management plan

Michael E. Rogers, Philip A. Stansly and Lukasz L. Stelinski

Effective control of the Asian citrus psyllid (*Diaphorina citri* Kuwayama) is an important component of Huanglongbing (HLB) management programs. Over the past several years, experience in Florida has shown that the most efficient way to control psyllids is for citrus growers to work together on an area-wide basis. The need for area-wide control of psyllids is due to the dispersal behavior of this pest which has been shown to move repeatedly between commercial citrus groves. When differences in timing of psyllid control programs exist within an area, the back and forth movement of psyllids could result in rapid re-infestations, despite the repeated attempts of individual growers to maintain psyllid populations at low levels. ***Successful psyllid management is a team effort with all citrus growers as participants.***

Establishment of Citrus Health Management Areas (CHMAs) has been proposed as an important strategy for reducing the spread of HLB. The primary goal of the formation of CHMAs is to coordinate psyllid control efforts to reduce the effect of psyllid movement between commercial citrus operations and thus reduce the need for repeated back-to-back insecticides applications for maintaining psyllid populations at low levels. Due to the limited number of pesticide modes of action available for controlling psyllids, CHMAs could also serve an important function in slowing pesticide resistance development in psyllid populations by coordinating applications of pesticides with similar modes of action.

Below, an example template (Table 1) is provided to aid in the development of a CHMA psyllid control program. Two key time slots and two more possible time slots are identified where grower coordination of psyllid control efforts are likely to be most effective in reducing overall psyllid populations. The first coordinated spray identified is during the month of November, just after the fall flush period has ended. Use of an organophosphate insecticide is recommended which would be appropriate for growers who do not plan on harvesting fruit during this time of the year. Blocks that will be harvested within 7 days of the coordinated spray could be treated with a pyrethroid. The next coordinated spray in January would be made in

those blocks with an OP while the rest of the area would be rotated to a pyrethroid. For any additional coordinated sprays conducted, growers are encouraged to rotate between these two pesticide modes of action. Use of organophosphate and pyrethroid insecticides for coordinated sprays is suggested because of 1) their general effectiveness in controlling all life stages of psyllids present when applications are made 2) there are multiple product choices within each mode of action and 3) these products can applied using various application methods. As a result, these products provide flexibility to growers with different financial constraints making widespread participation in the program more likely to occur. Between the two optimal and two additional times identified for coordinated sprays, guidance is given for selecting additional products for psyllid control where growers choose to incorporate additional products into their overall psyllid management program.

The purpose of this example template is to help guide growers in the development of a psyllid control plan for their CHMA. This template is intended to provide suggestions that growers can take into consideration. Ultimately, ***growers must decide how many sprays they can realistically coordinate in their CHMA and the timing of those applications.*** These decisions can be complicated by a number of factors that vary by region including citrus variety and harvest date, fresh fruit for export versus juice fruit, and other ongoing cultural practices.

In Table 2, additional information is provided for all insecticides that might be incorporated into a psyllid management program. Insecticides are grouped by chemical class (or mode of action) to aid in the rotation of products with different modes of action, the recommended rates of product that should be applied, the appropriate application methods for each product that have been demonstrated to be efficacious, restricted entry intervals (REIs) and pre-harvest intervals (PHIs), and additional comments for most effective use of a product.

Developing a CHMA psyllid management plan

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Month	Timing	Product[3]	Comments
November / December	After last flush of the season	Organophosphate[1]	*Optimal time for coordinated spray*; first dormant spray; serves as a clean up spray to eliminate adult ACP going into the overwintering period.
January / February	Prior to first flush of season	Pyrethroid[2]	*Optimal time for coordinated spray*; second dormant spray; prior to first flush in spring control ACP that overwintered as adults or reproduced on unexpected winter flushes.
March (bloom period)	Depending on pest pressure	several options	Do not use pyrethroid since previously used. Do not use an organophosphate which is planned for the next application. Products that can be sprayed during bloom include Micromite and Portal but should only be applied when new flush is present since these products only control psyllid nymphs (not adults).
April	Immediately post bloom	Organophosphate[1]	*Possible time for coordinated spray using an OP*; this time is the first opportunity to control adult psyllids that developed on flush associated with bloom when most insecticides cannot be applied due to label restrictions preventing application during bloom. Growers in CHMAs not participating in a coordinated spray at this time may choose to use a product with a different mode of action.
May	Depending on pest pressure	Various options	Could use a pyrethroid since not previously used. Other options include Movento, Delegate (if leafminer present) or carbaryl.
June	1st summer oil spray	Various options	Depending on the product used in the previous spray, numerous products (see Table 2) could be added to the summer oil sprays as well as tank mixed with other products depending on the life stages of psyllid controlled by each product and other pests requiring control such as leafminer or rust mites. During this time it may be difficult to coordinate sprays with the same mode of action, but coordination of the timing of summer oil sprays by growers within a CHMA could still be a feasible goal.
July	2nd summer oil spray	Various options	
August / September	Prior to fall flush	Pyrethroid[2]	*Possible time for coordinated spray using a pyrethroid*; Control psyllids that may have developed on sporadic summer flushes prior to the fall flush period when psyllid populations can rapidly increase. Growers in CHMAs not participating in a coordinated spray at this time may choose to use a product with a different mode of action.
October	Depending on pest pressure	Various options	Do not use pyrethroid since previously used. Do not use an organophosphate which is planned for next application. Options include Movento, Delegate, and carbaryl.

[1] Organophosphate insecticides that can be used for psyllid control include Dimethoate, Imidan, Lorsban, Malathion and various generic formulations of these products.

[2] Pyrethroid insecticides currently registered for use in Florida citrus include Danitol and Mustang.

[3] Refer to Table 2 for information on product rates, application methods, psyllid life stages controlled and effective application methods.

UF UNIVERSITY of FLORIDA
IFAS Extension

YOUNG TREE CARE

Michael Rogers[1]

September 2012

- Protecting the next generation of citrus trees from becoming HLB infected prior to reaching bearing age is critical for the survival of the Florida citrus industry.

- Young trees flush more often and are more prone to becoming infested with psyllids throughout the year compared to mature trees.

- The frequent flushing patterns makes relying solely on foliar insecticide sprays with short residuals unfeasible.

- Soil-applied systemic insecticides (neonicotinoids) which provide 6-8 weeks of psyllid control are the most effective tool for managing psyllids (and leafminer) on young trees.

- Currently three neonicotinoid products are registered for use in citrus: Admire Pro 4.6F (imidacloprid*), Platinum 75 SG (thiamethoxam), and Belay 50 WDG (clothianidin**)

- Although psyllids must first insert their mouthparts into the treated plant to contact the insecticide, the presence of these insecticides in the plant cause the psyllids to immediately quit feeding, thus reducing the chances of a tree becoming infected with HLB.

*various generic formulations are also available
** currently Belay 50 WDG (clothianidin) is only registered on non-bearing citrus

RATE PER ACRE (single application)
(Based on 140 trees/A)

	New Reset (2-3' height)	1-2 yrs (3-5' height)	3-5+ yrs (5-9' height)
Admire Pro 4.6F	3.5 fl oz (4 apps)	7 fl oz (2 apps)	14 fl oz (1 app)
Platinum 75 SG	1.835 oz (2 apps)	1.835 oz (2 apps)	3.67 oz (1 app)
Belay 50 WDG*	3.2 fl oz (4 apps)	3.2 fl oz (4 apps)	Currently non-bearing only

* Currently Belay can only be applied to nonbearing trees

RATE PER TREE

	New Reset (2-3' height)	1-2 yrs (3-5' height)	3-5+ yrs (5-9' height)
Admire Pro 4.6F	0.025 fl oz	0.05 fl oz	0.1 fl oz
Platinum 75 SG	0.0131 oz	0.0131 oz	0.026 oz
Belay 50 WDG	0.0229 fl oz	0.0229 fl oz	Currently non-bearing only

1. Michael E. Rogers, associate professor, Department of Entomology and Nematology, Citrus REC, Lake Alfred, Florida; Cooperative Extension Service, Institute of Food and Agricultural Sciences; University of Florida; Gainesville, FL 32611.

Flower Bud Induction Overview and Advisory

http://www.crec.ifas.ufl.edu/extension/flowerbud/index.htm

Gene Albrigo, Horticulturist Emeritus
Citrus Research & Education Center, Lake Alfred, FL

Overview of flower bud induction in Florida – Citrus flower bud induction starts in the fall and usually is completed by early January. Low temperatures first stop growth and then promote induction of flower buds as more hours of low temperatures accumulate (below 68 degrees F). A period of high temperatures in winter can then initiate bud differentiation which after sufficient days of warm springtime temperatures leads to bloom. Conditions that can interfere with good flower bud induction include: 1) several warm periods interrupting the induction process or 2) the previous crop was exceptionally high or 3) leaf loss from hurricanes, freezes or other causes (canker) were excessive and tree recovery was not complete. Excessive leaf loss leads to low carbohydrate levels in developing buds which reduces their ability to become flower buds. Under normal Florida weather conditions but with a moderate to heavy previous crop, sufficient flower bud induction should be achieved when total accumulated hours of low temperatures exceed 800 hours below 68 degrees F. If the crop load is light, sufficient flower bud induction may occur after 700-750 hours of accumulated low temperatures.

A warm period of 7 to 12 days, with maximum temperatures > 80 to 85 degrees F., can trigger growth (bud swelling) if a minimum total hours of low temperatures have accumulated (300-400 hours below 68 degrees F). Later in the winter when the accumulated cool temperature induction hours are high, fewer days and lower daytime highs (75 degrees F.) are required in a warm period to stimulate growth of buds. An 8 day forecast from the National Weather Service predicts Florida weather for several sites around the citrus belt for the next week. Find this information at: http://www.nws.noaa.gov/mdl/forecast/text/state/FL.MRF.htm. This is an easy way to see if a warm period, which could trigger flower bud growth, is predicted for your specific area in Florida.
Some flower buds will be induced in the range of 300 to 450 accumulated hrs < 68 degrees F. Warm events just after these levels of induction result in weak flowering intensity, and therefore many buds remain that can be induced by later cool periods, or these buds may sprout as vegetative shoots if warm weather continues and the trees are well watered. The first situation results in multiple cohorts of flower buds developing to different bloom dates. The second condition leads to low flowering-fruit set and excessive early spring vegetative growth.
Presently, the only management tool available to eliminate or reduce the chance of multiple blooms is sufficient drought stress to stop growth. This water stress may be provided by stopping irrigation well before these predicted warm periods occur. If the warm periods(s) are of the typical 7 to 10 day duration, a coincident short period of drought stress will have little impact on current crop development or quality. Sufficient drought stress may be interpreted as leaf wilt observed by 10 or 11 am, but leaves recovering by early the next morning. If no rains interrupt a drought stress condition in citrus trees, buds will not grow in response to high temperatures. If a warm period has passed, trees again can be irrigated to minimize current crop stress. Although no weather prediction is guaranteed, rains in the winter usually

come on the fronts for cool periods. Sufficiently cool temperatures after a cold front rain will usually prevent growth even though soil moisture is adequate for growth. Since winter rains usually occur just before cool temperatures, the chances that drought stress will prevent an early flower bud differentiation event are reasonably good for many warm periods. Even so, growers in some growing districts have often found it difficult to maintain winter drought stress.

In the shallow soils of bedded groves, it is relatively easy to create sufficient water stress to suppress growth by withholding irrigation for a few days if no rains occur. In deeper, sandy soils, 2 or more weeks without irrigation or rainfall may be required. To minimize the time required for soil to dry sufficiently to initiate water stress, the soil should be allowed to dry out by mid-November so that trees show wilt by mid-day. For bedded groves, minimum irrigation can then be applied at low rates as needed until a weather prediction indicates a warm period is expected. At this time, irrigation should be shut down. For deep sands, the soil needs to be dried out and kept nearly dry below 6 to 8 inches of depth until at least Christmas so that no growth can occur. Minimum irrigations that re-wet perhaps the top 6 to 8 inches of the root zone may minimize excessive drought, while allowing quick return to a water stress condition if a high temperature period is forecast. Soil moisture monitoring can help to achieve these goals. Prolonged late-fall, early-winter drought may be risky for 'Hamlin' or other early maturing cultivars not yet harvested that tend to drop fruit near harvest. In recent studies, Valencia trees in Central Florida have had good flowering and no apparent impact on current crop when irrigation was stopped in early December and resumed in the Spring. Much of what has been stated above has now been incorporated into a 'Flowering Expert System for Florida Citrus'. The system is available on-line: http://orb.at.ufl.edu/DISC/bloom.

FAWN (Florida Automated Weather Network)

Go to http://fawn.ifas.ufl.edu/

Click on Tools, then click on Cold Protection Toolkit or go directly to http://fawn.ifas.ufl.edu/tools/coldp/ Then Select a Tool.

New! **Graphic Forecast data for FAWN sites**

National Weather Service (NWS) forecast data for next 96 hours. Updated hourly.

Minimum Overnight Temperature

Estimates based on the Brunt equation and the air & dew point temperatures at sunset.

Evaporative cooling potential

Determining the risk of using irrigation for cold protection, and see the risk calculated at FAWN stations.

There is always a risk when using water systems, micro-sprinkler or conventional sprinkler, for cold and/or frost protection. Low humidity and wind can produce evaporative cooling which can chill plant surfaces to the wet bulb temperature. Dry and windy conditions can result in wet bulb temperatures 5F to 6F degrees lower than air temperature. Therefore, wetted plant surfaces that experience evaporation would be 5F to 6F degrees cooler than air temperature. Evaporative cooling may result in plant damage when water is used for cold protection during dry windy conditions. Evaporative cooling should always be taken into consideration.

It is possible that, on nights when temperatures are close to critical levels, introduction of water could produce more damage than would result if no action was taken!

Wet-Bulb Based Irrigation Cutoff Temperature

The safe cutoff temperature based on current FAWN conditions.

COLD HARDINESS AND COLD PROTECTION

Two major environmental factors in Florida citrus that regulate cold hardiness are temperature and water.

At 55^0 F, citrus plant growth slows. As temperatures remain below 55^0 F, citrus trees will continue to acquire acclimation to these cooler temperatures. This process is reversible during warm winter periods, and de-acclimation (loss of acclimation) can occur. The greatest amount of citrus acclimation occurs during consistently cool fall and winters. Once de-acclimation occurs citrus trees will generally not re-acclimate to the same level prior to the onset of de-acclimation.

Irrigation and fall/winter rainfall can have a pronounced effect on the citrus acclimation process. Drought induced stress has been shown to increase the tolerance of citrus trees to freezing temperatures when compared to well watered or over watered citrus trees in Florida. However, excessively drought stressed trees are more susceptible to freeze damage.

Critical Temperatures for Florida Citrus

It is very important to know the critical temperature at which freezing temperatures can damage citrus. Minimum temperature indicating thermometers are a wise investment for any grower concerned with freeze/frost protection. Thermometers should be installed in the coldest grove locations. They should be placed at a height of 42 inches (4.5 ft) on a stand, sheltered at the top and facing north. In citrus trees, there can be a great deal of variation in the minimum temperature at which plant damage will occur.

The reference temperature and duration for the initiation of the freezing process in round oranges is 28^0 F for four hours. Tangerines and fruit with smaller mass would receive freeze damage after shorter durations, while grapefruit would require longer durations.

Minimum temperatures of 26^0 F will damage fully mature, harden-off leaves that have not received any acclimation. Minimum temperatures of 30^0 F can significantly damage unhardened new flush leaves. Leaves that have received extensive acclimation have been shown to survive temperatures as low as 20^0 F in Florida.

Protecting citrus trees from cold damage

Cultural practices can have a major influence on the cold hardiness of citrus trees. A clean, hard-packed soil surface intercepts and stores more solar radiation during the day and releases more heat at night than a surface covered with vegetation or a newly tilled area. Irrigation should be applied minimally during the fall and winter. Reducing irrigation results in an increase in the cold tolerance of citrus trees and enhances tree stress resulting in an increase in the formation of flower buds. Excessive application of nutrients should be avoided late in the fall especially with young citrus trees. Heavy hedging or topping during the winter can reduce citrus cold hardiness by reducing canopy integrity that would trap heat released by the soil. This should be avoided.

Water from micro sprinkler irrigation protects young trees by transferring heat to the tree and the environment. The heat provided is from two sources, sensible heat and the latent heat of fusion. Most irrigation water comes out of the ground at 68° to 72°F, depending on the depth of the well. The major source of heat from irrigation is provided when the water in the liquid form changes to ice (latent heat of fusion).

As long as water is constantly changing to ice, the temperature of the ice-water mixture will remain at 32°F. The higher the rate of water application to a given area, the greater is the amount of heat energy that is applied. When expecting a freeze, turn on the water early before the air temperature reaches 32^0F. Remember that in cold pockets, the ground surface can be colder than the air temperature reading in a thermometer shelter. Once irrigation has begun, the system must run for the duration of the time plant temperatures are below the critical temperature. Growers are recommended to use the information at the FAWN website (http://fawn.ifas.ufl.edu) to determine when it would be safe to turn off or on their micro-sprinkler irrigation system. For more details, go to http://edis.ifas.ufl.edu/HS179, http://edis.ifas.ufl.edu/CH182, http://edis.ifas.ufl.edu/CH054

In bedded groves to provide additional cold protection, water should also be pumped high in the ditches the day before and during the time of freezing weather.

EXTENSION EDUCATIONAL PROGRAM QUESTIONNAIRE

Dear "Flatwoods Citrus" newsletter subscriber:

We would appreciate it if you fill out this survey and return it to: **Mongi Zekri, P.O. Box 68, LaBelle, FL 33975 E-mail:** maz@ufl.edu **Fax: 863 674 4636**

Why do growers attend IFAS Extension Seminars & Workshops?

Please identify the level of importance for each of the following factors that influence you to participate in an Extension Educational Program.

	Not Important ▼	Slightly Important ▼	Somewhat Important ▼	Moderately Important ▼	Very Important ▼
CEUs & CCAs are offered					
Topics are relevant to your needs . .					
Includes a field day or a site visit . .					
Hands on activities are included . . .					
Production topics are emphasized . .					
Business and marketing topics are emphasized					
Regulatory topics are emphasized. .					
Day of the week and time of the day for the workshop					
Limited to 2-4 hours (1/2 day)					
Workshop occupies a full day (5-8 hours)					
Finding information on workshop in local media outlets					
Learning about workshop from other growers					
The Extension Agent who organizes the workshop					
Providing a brief description of the intended workshop speakers					
The workshop is free					
Refreshment and meals are provided free at the workshop					

FLATWOODS CITRUS NEWSLETTER EVALUATION FORM

Please take a moment to rate the quality and usefulness of the information presented in the Flatwoods Citrus newsletter. Please send back the form to:
Dr. Mongi Zekri
University of Florida, IFAS
Hendry County Extension Office
P.O. Box 68
LaBelle, FL 33975
or e-mail to maz@ufl.edu or fax to: 863 674 4636. Thank you for your input!!!

Please circle your answer

1	Did the information seem up to date and accurate?	Yes	No	Uncertain
2	Was the information delivered on time to be useful?	Yes	No	Uncertain
3	Was the information relevant to your situation?	Yes	No	Uncertain
4	Was the information easy to understand?	Yes	No	Uncertain
5	Have you had an opportunity to use the information?	Yes	No	Uncertain
6	Have you shared the information with someone else?	Yes	No	Uncertain

7 Overall, how do you feel about the Flatwoods Citrus Newsletter?

Satisfied Neither Satisfied Nor Dissatisfied Dissatisfied

8 **Do you have any suggestions that might improve the newsletter?**

(Please write in any comments)

9. How many years have you been using the Extension Service? _____ Years

10. What is your employment status?

_____ Grower	____ Chemical Industry	____ Service Provider
_____ Production Manager	____ Regulator	____ University
_____ Consultant	____ Association	Other _____

We appreciate your reactions and the time you have given us. Thank you, and please contact us when we may be of service to you.

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