

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

# Flatwoods Citrus



**Vol. 22, No. 11**      **November 2019**

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



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# Seminar

## **“CUPS, mini-CUPS and other strategies to manage HLB”**

Date: Tuesday, December 17, 2019, Time: 10:00 AM – 12:00 Noon

Location: Immokalee IFAS Center

Program Coordinator: Mongi Zekri, UF-IFAS

### **Pre-registration is required.**

No registration fee and lunch is free. To reserve a seat, call 863 674 4092, or send an e-mail to Dr. Mongi Zekri at: [maz@ufl.edu](mailto:maz@ufl.edu)

**2 CEUs for Certified Crop Advisors (CCAs)**  
**2 CEUs for Pesticide License Renewal**

### **Agenda**

----10:00 AM - 10:30 AM

#### **“Citrus Under Protective Screen (CUPS)”**

- Vector exclusion
- HLB incidence under CUPS
- High density planting
- Fruit production and quality
- Insect pests

**Dr. Rhuanito (Johnny) Ferrarezi, UF-IFAS**

----11:30 AM - 11:00 AM

#### **“Individual Protective Covers (IPCs), mini-CUPS”**

- Tree performance
- Tree growth
- Leaf drop
- Insect pests

**Dr. Fernando Miguel Alferez, UF-IFAS**

### **11:00 AM – 11:10 AM Break**

----11:10 AM - 12:00 Noon

#### **“Citrus Pest Management in Open and Protected Systems”**

- Cultural pest control
- Biological control
- Chemical control
- Citrus pest complex
- Pest problems in advanced production systems
- New pest concerns for citrus

**Dr. Jawwad Qureshi, UF-IFAS**



**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, February 5, 2020**. 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 (or your office e-mail address).
5. Your contact phone number.
6. A check made out to: Hendry County 4-H for \$50.00.

The first fifty individuals to provide these six 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 it as directed.

Sincerely,

**Mongi Zekri**

---

**For Questions Contact: Dr. Mongi Zekri at [maz@ufl.edu](mailto:maz@ufl.edu) or 239-595-5494**

---

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# Registration Form

## Florida's Certified Pile Burner Program

*Wednesday, February 5, 2020*

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

---

Name

---

Mailing address

---

Email address

---

Phone Number

---

Florida Forest Service Customer Number, <https://www.freshfromflorida.com/Divisions-Offices/Florida-Forest-Service/Our-Forests/Field-Operations/County-Foresters/Find-a-County-Forester>



# Florida's Certified Pile Burner Training

Wednesday, February 5, 2020

**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**

**E-mail: maz@ufl.edu**



## 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.

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



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President

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# EL NIÑO/SOUTHERN OSCILLATION (ENSO) DIAGNOSTIC DISCUSSION

issued by

**CLIMATE PREDICTION CENTER/NCEP/NWS**  
**and the International Research Institute for Climate and Society**  
10 October 2019

**ENSO Alert System Status: Not Active**

**Synopsis: ENSO-neutral is favored during the Northern Hemisphere fall 2019 (~85% chance), continuing through spring 2020 (55-60% chance).**

Near-average sea surface temperatures (SST) were evident in the east-central Pacific Ocean during most of September, though SST anomalies increased during the past couple of weeks (Fig. 1). In the last week, the SST indices in the westernmost Niño-4 and Niño-3.4 regions were +1.0°C and +0.5°C, respectively, and the indices in the easternmost Niño-3 and Niño-1+2 regions remained near-to-below average (+0.3°C and -0.6°C respectively; Fig. 2). The subsurface temperature anomalies (averaged across 180°-100°W) increased during the month (Fig. 3) partially because a downwelling oceanic Kelvin wave expanded eastward (Fig. 4). This wave was triggered by low-level westerly wind anomalies across the western and central equatorial Pacific Ocean. At upper-levels, easterly wind anomalies prevailed over much of the Pacific during September. Also, the region of suppressed convection over Indonesia intensified and expanded to the Date Line (Fig. 5). Despite the recent warming, the overall oceanic and atmospheric system remained consistent with ENSO-neutral.

The majority of models in the IRI/CPC plume (Fig. 6) continue to favor ENSO-neutral (Niño-3.4 index between -0.5°C and +0.5°C) through the Northern Hemisphere spring. Many dynamical forecast models, including the NCEP CFSv2, suggest Niño-3.4 SST index values will remain near +0.5°C during the next month or so before decreasing, but remaining above zero. Consequently, forecasters believe the recent oceanic warmth reflects sub-seasonal variability and is not indicative of an evolution toward El Niño. However, chances for El Niño remain between approximately 25-30% through the winter and spring. In summary, ENSO-neutral is favored during the Northern Hemisphere fall 2019 (~85% chance), continuing through spring 2020 (55-60% chance; click [CPC/IRI consensus forecast](#) for the chance of each outcome for each 3-month period).

This discussion is a consolidated effort of the National Oceanic and Atmospheric Administration (NOAA), NOAA's National Weather Service, and their funded institutions. Oceanic and atmospheric conditions are updated weekly on the Climate Prediction Center web site ([El Niño/La Niña Current Conditions and Expert Discussions](#)). Forecasts are also updated monthly in the [Forecast Forum](#) of CPC's Climate Diagnostics Bulletin. Additional perspectives and analysis are also available in an [ENSO blog](#). The next ENSO Diagnostics Discussion is scheduled for 14 November 2019. To receive an e-mail notification when the monthly ENSO Diagnostic Discussions are released, please send an e-mail message to: [ncep.list.enso-update@noaa.gov](mailto:ncep.list.enso-update@noaa.gov).

**Climate Prediction Center**  
**National Centers for Environmental Prediction**  
**NOAA/National Weather Service**  
**College Park, MD 20740**

## Top Clones Propagated 2018-2019

Variety Clone	# Budded	
1	Valencia SPB-1-14-19	1,465,751
2	Hamlin 1-4-1	568,093
3	Vernia UF 35-15	461,988
4	Valencia F-55-4	229,299
5	Bearss Le SPB-341-95-33	141,682
6	Hamlin 8-1-4	63,825
7	Sweet Orange UF OLL8	54,540
8	Ruby Red Gft F-58-39	53,728
9	Valencia SPB-1-14-31	53,450
10	Flame Gft US 1-26-71	52,765
11	WG Man 911-C-37	46,200
12	Star Ruby Gft DPI-60	38,771
13	Valencia UF B9-65	38,496
14	Tango CGIP-168	37,821
15	Hamlin 8-1-5	36,630
16	Minneola F-60-5	32,914
17	WG Man 911-17	31,770
18	Valencia F-55-23	26,394
19	Meyer Le US	25,280
20	Glen Navel F-56-11	24,775
21	Cara Cara Navel CGIP-104	22,233
22	Bingo UF 7-6-27	20,259
23	Sweet Orange UF OLL4	19,430
24	Key Lime SPB-51-12	18,947
25	Brown Select Sat 61-0-1	18,510
26	Florida EV1 UF B7-70	18,390
27	Sugar Belle UF LB8-9	18,064
28	Early Pride US 1-62-122	17,824
29	Ray Ruby Gft CGIP-103	15,868
30	Persian Lime SPB-7	15,654

# CITRUS BUDWOOD

## Annual Report

2018-2019

Bureau of Citrus Budwood Registration

Ben Rosson, Chief

## Top Rootstocks

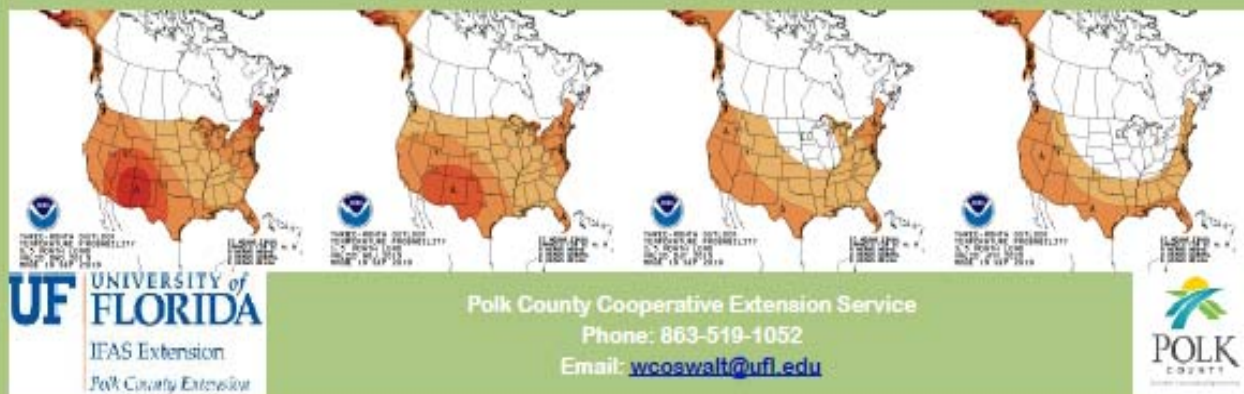
2018		# Budded	2017	2016	2015	2014
1	US-942	846,608	Swingle	Kuharske	Kuharske	Swingle
2	Swingle	650,479	US-942	X-639	X-639	Kuharske
3	Kuharske	581,493	X-639	S/O	Swingle	Sour Orange
4	X-639	575,249	Kuharske	US-897	Sour Orange	X-639
5	Sour Orange	407,715	Sour Orange	SWG	Cleopatra	US-802
6	US-802	259,336	US-802	US-942	US-802	US-812
7	Volkamer	146,724	US-897	US-802	US-897	US-897
8	US-812	125,317	UFR-04	US-812	US-942	Cleopatra
9	US-897	92,148	US-812	Cleopatra	US-812	Carrizo
10	Rough Lemon	51,729	C-35	UFR-04	C-35 Citrange	Volkamer
11	C-35	44,180	Cleopatra	Volkamer	Carrizo	US-942
12	UFR-04	30,089	Volkamer	Kinkoji	Volkamer	C-35 Citrange
13	UFR-17	21,747	UFR-03	UFR-03	Own Root	Research Stock
14	Poncirus trifoliata	21,255	C-22	Carrizo	UFR-04	Unknown
15	US-1516	13,261	Carizzo	Rough Lemon	Kinkoji	Rough Lemon
16	Carrizo	12,440	Rough Lemon	Research	Rough Lemon	Kinkoji
17	Cleopatra	12,355	UFR-17	UFR-02	Unknown	Flying Dragon
18	Orange 14	9,963	Kinkoji	UFR-17	UFR-03	Poncirus trifoliata
19	C-54	9,255	UFR-01	UFR-16	Benton	Sun Chu Sha
20	C-22	7,097	Flying Dragon	Sun Chu Sha	Poncirus trifoliata	UF-02

**CITRUS BUDWOOD**

Annual Report

2018-2019

# Winter Weather Watch



## UF/IFAS Polk County Cooperative Extension Service

The 2019 - 20 version of the Winter Weather Watch will begin on November 15, 2019. Time is short so send in your subscription form to receive timely agricultural winter weather forecasts and information.



The 2019-20 edition of the Polk County Winter Weather Watch program will begin on November 15, 2019. 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 provided by our own meteorologist Fred Crosby. 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 2019-20 Winter Weather Watch manual. You will also have access to weather data from five Polk County Citrus Extension Weather Stations.

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.

# FORECAST SCHEDULE

Forecast Product	Above 32 ° F	32°-29°F	Below 28° F
Zone	Daily 8:30 a.m.	Daily 8:30 a.m.	Daily 8:30 a.m.
6-10 & 8-14 Day Outlooks	Mon/Wed/Fri 8:30 a.m.	Mon/Wed/Fri 8:30 a.m.	Mon/Wed/Fri 8:30 a.m.
Weekly Outlook	Friday 5:00 p.m.	Friday 5:00 p.m.	Friday 5:00 p.m.
Leaf Freezing Temperatures	Friday 5:00 p.m.	Friday 5:00 p.m.	Friday 5:00 p.m.
Special Weather Narratives	As Needed	Daily 4:00 p.m.	Daily 4:00 p.m.
Afternoon Zone	None	Daily 5:30 p.m.	Daily 5:30 p.m.
Sunset/Brunt	As Needed	As Needed	Daily 7:00 p.m.

# 2019 - 2020 WINTER WEATHER WATCH PROGRAM

NOVEMBER 15, 2019 TO MARCH 15, 2020  
REGISTRATION FEE: \$100.00



It's once again time to register for the upcoming 2019 - 2020 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.



---

## 2019 - 2020 Winter Weather Watch Program

NAME: \_\_\_\_\_ PHONE NUMBER: \_\_\_\_\_

ADDITIONAL PHONE NUMBERS: \_\_\_\_\_

COMPANY: \_\_\_\_\_

MAILING ADDRESS: \_\_\_\_\_

EMAIL ADDRESS: \_\_\_\_\_

CITY: \_\_\_\_\_ ZIP CODE: \_\_\_\_\_

REGISTRATION FEE \$100.00

PLEASE RETURN THIS REGISTRATION FORM AND YOUR CHECK PAYABLE TO:  
**POLK COUNTY EXTENSION CITRUS ADVISORY COMMITTEE**  
**PO BOX 9005, DRAWER HS03**  
**BARTOW, FL 33831-9005**



## HEDGING, TOPPING, AND SKIRTING CITRUS TREES

The interception and utilization of sunlight should be an important consideration in citrus grove design. The effect of insufficient light is frequently observed in mature citrus groves that are not pruned (hedged, topped) regularly. Shading reduces yield and foliage on the lower parts of the trees. Sunlight not only influences flowering and fruit set but also enhances fruit quality and color development. Increased sunlight penetration within the tree canopy might also allow foliage to dry quicker after a rain shower and could help reduce establishment of fungal pathogens. Therefore, adjustments must be made in tree height and hedging angle to maximize sunlight interception.

Hedging and topping are important cultural grove practices. Severe hedging or topping of citrus trees during the winter can reduce cold hardiness. Trees with exposed internal scaffold wood and new tender growth are susceptible to cold injury.



In general, tree response to hedging and topping depends on several factors including variety, rootstock, tree age, growing conditions, time of pruning, and production practices. No one system or set of rules is adequate for the numerous situations encountered in the field. Growers are encouraged to gain a clear understanding of the principles involved in hedging and topping, and to take advantage of research results as well as consulting knowledgeable colleagues and custom operators for their observations.

Hedging should be started before canopy crowding becomes a problem. Developing a pro-active pruning program should assist managers in removing the right-sized branches. Removal of a significant portion of the tree will result in excessive vegetative growth and a drastic reduction in subsequent yield. Hedging is usually done at an angle, with the boom tilted inward toward the treetops so that the hedged row middles are wider at the top than at the bottom. This angled hedging allows more light to reach the lower skirts of the tree. Hedging angles being commonly used vary from 10 to 15 degrees from vertical.

Topping should be done before trees have become excessively tall and should be an integral part of a tree size maintenance program. Long intervals between topplings increase the cost of the operation due to heavy cutting and more brush disposal. Furthermore, excessively tall trees are more difficult and expensive to harvest and spray. Topping trees will improve fruit quality and increase size. Some common topping heights are 10 to 12 ft at the shoulder and 13 to 14 ft at the peak. As a general rule, topping heights should be two times the row middle width.



After severe hedging or topping, heavy nitrogen applications will produce vigorous vegetative regrowth at the expense of fruit production. Therefore, nitrogen applications should be adjusted to the severity of hedging and/or topping. Reducing or omitting a nitrogen application before and possibly after heavy hedging will reduce both costs and excessive vegetative regrowth. Light maintenance hedging should not affect fertilizer requirements.

Large crops tend to deplete carbohydrates and results in a reduced fruit yield and increased vegetative growth the following year. Pruning after a heavy crop additionally stimulates vegetative growth and reduces fruit yield the following year. Pruning after a light crop and before an expected heavy crop is recommended because it can help reduce alternate bearing which can be a significant problem in Valencia and Murcott production.

Severe hedging may create problems of brush disposal and stimulates vigorous new vegetative growth, especially when done before a major growth flush. This happens because an undisturbed root system is providing water and nutrients to a reduced canopy area. The larger the wood that is cut, the larger is the subsequent shoot growth. Severe pruning reduces fruiting and increases fruit size.



The best time of year to hedge and/or top depends on variety, location, severity of pruning, and availability of equipment. Since pruning is usually done after removal of the crop, early maturing varieties are generally hedged before late maturing varieties. Most growers prefer to hedge before bloom, but trees will get more vegetative regrowth, which may not be desirable. Pruning could begin as early as November prior to harvesting in warmer areas. During this period, conducted pruning operations should only cut minimal foliage and fruit from the trees.

Valencia trees may be hedged in late fall with only minimal crop reduction when the hedging process removes only

a small amount of vegetative growth. In cases where excessive growth is to be removed, the trees are usually harvested before hedging is conducted. Light maintenance pruning can be done throughout the summer and until early fall with little or no loss in fruit production. Moderate to severe pruning should not continue into the winter in freeze-prone areas, as trees with tender regrowth are susceptible to cold injury.

With citrus canker and greening diseases, selecting the best time for hedging and topping is becoming more complicated. New growth flushes promoted by hedging and topping in late spring, during the summer, and early fall can increase the population of leafminers and psyllids and aggravate the spread of citrus canker and greening. Declining trees with defoliated tops, dieback, reduced cropping, and severe root loss due to citrus greening are being hedged and topped to help balance the shoot to root ratio to improve tree performance and extend tree longevity.



Skirting is the pruning to raise tree skirts. Without skirting, the movement of herbicide booms is impeded. Fruit and limbs near the ground are often damaged by the passage of such equipment and by herbicide spray and fertilizer contact. Skirting allows uniform distribution of granular fertilizers and good water coverage of microsprinkler irrigation systems under tree canopies. Skirting facilitates the inspection of microirrigation systems and reduces the incidence of *Phytophthora* foot rot and brown rot because it allows good air circulation.

# ALGAE



## Algae are in the plant kingdom, but maybe they're not really plants!

In Florida's freshwaters, algae are what make the water green, or even "slimy". However, green water is not necessarily undesirable, and neither are algae. In fact, algae are essential to the ecosystem and to life as we know it, and must be treated with respect.

**Algae are a diverse group of organisms,** which survive in all different types of habitats. They range in size from microscopic to meters in length and in complexity from single-celled to complex organisms that would rival even large plants. Though these organisms may look like the true, "higher", plants, they are anything but, since they do not have roots or true stems and leaves.

**Algae are one of the first steps of the food web.** There are microscopic algae, like phytoplankton, and there are macroalgae, algae that can be seen by the naked eye. Algae occur naturally in all types of systems and may be considered indicators of ecosystem condition. Even the mere presence of a species can give an indication of the amount and type of nutrients that run through the system. Algae provide food for all types of animals, including fish, insects, mollusks, zooplankton (microscopic animals), and humans.

## What causes an algae bloom?

**At times algae can grow so quickly and densely that they form a "bloom".** Many people don't like the "look" of a bloom, though blooms can be a natural occurrence. Blooms are not necessarily green, though that is the most common color. They can be blue-green, brown, red, and even violet.



Some blooms turn the water a certain color; this is usually a bloom associated with phytoplankton (microscopic algae). Other blooms form clumps or mats that float on top of the water, or that grow attached to the bottom or to plants. Still others can form dense mats that cover the water surface. Algae need nutrients, such as nitrogen and phosphorous, and light to grow. The level of growth or productivity is often dependent on the amount of nutrients in a system. There is a classification for productivity of a system; it ranges from oligotrophic (low productivity and nutrients) to hypereutrophic (very high nutrients). Also, since algae need light to photosynthesize, how far light penetrates the water is also another limiting factor.

Blooms can have far reaching effects on the environment. Some can become so dense they can ultimately cause a problem with [low oxygen](#) levels. A decrease in oxygen causes hypoxia (low oxygen) or anoxia (no oxygen) and the other organisms in the water that need oxygen to survive, such as fish, become stressed and may die. Other blooms may release toxins that can be harmful to animals.

There is a general consensus that rapidly growing human development, and increased human use and disposal of nutrients over the past few centuries, has increased the frequency and intensity of algal blooms in many regions of the world. This has created a global effort to control harmful blooms.

## Controlling blooms

**The most direct way to control blooms** is to reduce the availability of nutrients. Most water management organizations throughout the world are actively pursuing a variety of nutrient control strategies. However, for some aquatic ecosystems nutrient control is impractical, ineffective or simply too costly. For some cases chemical or biological treatments can be helpful alternatives.

### Chemical Treatments

**Copper sulfate** (bluestone) and **chelated copper compounds** such as Cutrine-Plus, Algae Pro, and K-TEA, as well as Endothall are common chemical treatments used to kill algae. Chemical compounds that shade out the light for algae growth, e.g. Aquashade, are also used to control blooms. Each chemical has its own restrictions and toxicity to animals. Read the directions carefully before application.

### Biological Treatments

The main biological treatment that is employed today is the use of various carp fish species to control submersed and floating algae. **Grass carp** (*Ctenopharyngodon idella*) is mainly used for aquatic weeds and attached submersed algae, such as *Nitella* sp., and *Chara* sp. Where they do not prefer filamentous algae to eat, grass carp will eat *Lyngbya*. The **silver carp** (*Hypophthalmichthys molitrix*) has been shown to be an effective treatment

for controlling filamentous algae, including blue-green algae.

Both species are non-native species and there are many restrictions to employing them as a means of weed control; some states prohibit their use altogether. When they are allowed, the use is restricted to **triploid carp**. Triploid carp have an extra set of chromosomes that render the fish sterile, therefore prohibiting a population explosion if the fish escapes into an uncontrolled area.

### Physical Treatments

Physical treatments for algae in ponds include [aeration and airlifts](#). While aeration does not kill or remove algae from the water, it oxygenates and stirs the water column, and can create conditions to shift from toxic and smelly blue-green algae to preferred green algae species. The resultant algal population is usually not as dense or as toxic to other organisms in the ponds.

### Mechanical Treatments

Harvesters are sometimes used to skim dense mats of blue-green *Lyngbya* algae from the surface of lakes and rivers. *Lyngbya* normally grows in dense mats at the bottoms of nutrient enriched lakes. These mats produce gasses during photosynthesis that often causes the mats to rise to the surface. At the surface, winds pile the algal mats against shorelines or in navigation channels; these mats can be several acres in size. Managers have developed a process called "grubbing" whereby harvesting machines lift the mats off of submersed plants such as native eelgrass, without cutting the eelgrass. By removing the blanket of *Lyngbya* from the eelgrass, the plants grow and expand. Eelgrass is an important food source for manatees in the Crystal and Homossassa Rivers.



## WHERE FLORIDA'S WATER COMES FROM?

Please be active in conserving and protecting our waters

Average annual rainfall in Florida is 53 inches, making it one of the wettest states in the nation. The state's differing climate types yield much rainfall variability from region-to-region and from year-to-year. In central and South Florida, most of the rain falls during four summer months and much of the annual amount is "lost" to the natural hydrologic system through evaporation. The region is prone to wide weather extremes of flood and drought.

Nearly two-thirds of Florida's freshwater use is pumped from vast underground reservoirs called aquifers. Of Florida's groundwater sources, the deep Floridan Aquifer, which spans the majority of the state, supplies 62%; the shallower Biscayne Aquifer (underlying most of Miami-Dade and Broward and portions of Palm Beach and Monroe counties), provides 17%; the remaining 21% is supplied by surficial and intermediate unnamed aquifers. The state's remaining freshwater is supplied from surface waters, including lakes and rivers.

In South Florida, approximately 90% of the water used in homes and businesses comes from groundwater sources. The remaining 10% comes from surface waters. Both surface and groundwater supplies are highly dependent on rainfall for replenishment.



At the heart of the South Florida system sits Lake Okeechobee – the largest natural water body in the southeastern United States. It serves as a source of public water supply for the City of Okeechobee (16,000 utility customers) and provides a supplemental source of irrigation water to more than 700,000 acres in agricultural production. In addition, it serves as the backup water supply for more than five million residents. The massive lake also plays a critical environmental and economic role as a sport and commercial fishery, navigation/recreation waterway and natural habitat for fish, wading birds and other wildlife, including a variety of endangered and threatened species.

While heavy rainfall throughout South Florida benefits and recharges underground supplies, the ability to capture and store the rainwater for future use is extremely limited. When floods threaten – even during water shortage situations – the top priority is channeling the excess water away from homes and businesses as quickly as possible. To lower the levels in coastal canals and accommodate direct rainfall and stormwater runoff, freshwater must oftentimes be released to the ocean or gulf.

The demand for water by growing urban populations and agricultural operations in South Florida is expected to increase significantly in the coming decades. Meeting the growing need for water hinges on our efforts to develop region-specific sources that offer an alternative to traditional ground water and surface water. Alternative water sources are important to Florida's future. They also help to make communities less susceptible to the effects of drought.

Developing alternative water sources diversifies our supply while reducing our dependence on fresh water resources. Examples of Alternative Water Supply are:

- saltwater and brackish water
- water reuse
- surface water captured predominately during heavy rainfalls
- sources made available through the addition of new storage capacity
- stormwater (for use by a consumptive use permittee)
- any other source designated as nontraditional in a regional water supply plan

To address the challenge of ensuring the state's current and future water supply, the 2005 Florida Legislature enacted the Water Protection and Sustainability Program. This precedent-setting law encourages cooperation between municipalities, counties and the state's five water management districts to protect and develop water supplies in a sustainable manner. Water management districts are promoting and supporting local government alternative water supply projects that support smart growth and reduce the use of fresh ground and surface water supplies, such as aquifers and lakes for a sustainable future.

Water reuse plays an important role in water resource, wastewater and ecosystem management in Florida. When reclaimed water is used, it eases the demand on traditional, often limited, sources of water. By recycling or reusing water, communities can still grow while minimizing or even reducing their impact on the water resources around them.

Water reuse involves using highly treated domestic wastewater for a new purpose. Reclaimed water systems are continually monitored to ensure the health and welfare of the public and the environment are protected.

Using reclaimed water also reduces discharges to surface waters, recharges ground water and postpones costly capital investments in the development of new, more costly water sources and supplies. Reclaimed water is an excellent water source for:

- Irrigating golf courses, residences, highway and street medians and other landscaped areas
- Meeting urban demands for water to wash cars, flush toilets and maintain ponds and fountains
- Meeting industrial and commercial demands for water at power plants and for processing needs
- Irrigating food crops, such as citrus, and irrigating other crops and pastures for livestock
- Creating wetlands and enhancing restoration
- Recharging groundwater

## Saline Irrigation Water: Impacts on Citrus Production

### ***What conditions lead to irrigation water becoming salinized?***

Irrigation of Florida citrus can be challenging due to the variety of ways that salts can be introduced into the agricultural water supply. For example, the use of Floridan aquifer water containing high salt levels, leaking artesian wells that have contaminated surficial aquifer wells, saltwater intrusion into groundwater aquifers, and the salt index of fertilizers are all factors that should be taken into consideration when developing a citrus irrigation management plan. In general, all irrigation water has at least some dissolved salt. The degree to which irrigation water is salinized can be measured through monitoring the Total Dissolved Solids (TDS). Typically, irrigation water intended for citrus production is usually considered “adequate” if the TDS (measured in parts per million, ppm) is less than 1,000 ppm – 1,200 ppm. In irrigation water with TDS values greater than 1,000 ppm, the potential for developing toxic conditions for plant growth arises from high levels of sodium and chloride ions. High concentrations of these ions, even when the total volume of irrigation water applied is adequate for tree growth and fruit production, can make it more difficult for a tree to take up water from the soil due to increased osmotic stress of the plant’s root cells.

### ***Why is monitoring irrigation water salinity important?***

If irrigation water salinity is not managed (for example, if the TDS value chronically exceeds 1,200 ppm), there is an increased risk of toxicity to the citrus tree. Highly salinized water negatively affects all biological stages of citrus, including root, leaf, and fruit development (**Figure 1**). Citrus is considered to be a salt-sensitive crop because important plant physiological processes (including leaf photosynthesis and flower induction) are negatively impacted with even moderately salinized irrigation water.

### ***How can irrigation water salinity be managed?***

Throughout the growing season, water content within the soil fluctuates. During the rainy months of summer, water content is higher, and in the drier months of winter, it is lower. Salt ions become concentrated within the soil when water contents are relatively low. This is due to the inability of salts to be leached below the citrus tree’s root zone. Thus, periodic leaching may be required to help flush salts from the root zone. This flushing is accomplished by frequent irrigation cycles during the dry months of the year.

If groves are located in a region where it is known that TDS values regularly exceed 1,200 ppm, or in areas where soil is poorly drained or where there is a perched water table, there is an increased risk of salinity-associated plant toxicity. In these situations, frequent irrigation cycles are also used to help flush excess salts beyond the citrus tree’s root zone. However, salt concentrations also fluctuate throughout the year, and it is important to regularly monitor the TDS value of irrigation water. A County Extension Agent can assist in developing a salinity monitoring program, including providing instructions on how to take water samples and interpreting the results. Regular maintenance of any water furrows, ditches, and canals will also reduce the risk of developing salinity-associated toxicity by ensuring that the soil in the grove is drained properly.

The salt index (**Table 1**) and fertilizer source materials should be taken into consideration when developing a citrus irrigation management plan. As values of the salt index increase, the osmotic stress (the stress placed on citrus roots' ability to absorb water from the soil) also increases. Thus, selecting fertilizers with low salt indexes, particularly in situations where TDS values exceed 1,200 ppm, should be part of the management program. Specifically, replacing sodium nitrate and potassium chloride N and K sources with lower salt index N and K materials should result in lowered salinity-associated stress and reduce exposure to toxic Na and Cl in the soil solution. Frequent irrigation cycles aimed at leaching salts below the root zone (mentioned above) can also flush essential plant nutrients away from roots. Therefore, using split-applications of dry, water-soluble fertilizers several times during the year, or low-volume, low-concentration with high-frequency liquid fertigation cycles, may be preferred to fewer fertilizer applications at higher rates.

Citrus scion cultivar and rootstock also have known interactions with salinized irrigation water. Generally, grapefruit cultivars are more sensitive to high salt levels than orange cultivars; although both grapefruit and orange cannot tolerate salinized irrigation water for long periods of time. Through both anecdotal and formal research observations, it has been noted that some rootstocks are more forgiving of saline irrigation water than others. The following rootstock varieties are generally viewed as being relatively less-to-more sensitive to salinity: 'Cleopatra' mandarin, sour orange, sweet orange, 'Swingle' citrumelo, 'Carrizo' citrange, and rough lemon.

### ***In summary***

The salinity of irrigation water can have far-reaching effects on citrus production. Chronically high levels of salt (when TDS values exceed 1,200 ppm) can severely damage citrus tree growth and fruit production. Under these conditions, it is important to regularly provide a flushing irrigation that will be successful in leaching potentially toxic salt ions past the root zone. Even when water sources typically have TDS values below 1,200 ppm, periods of little rainfall can lead to high concentrations of salt ions in the soil. Thus, a leaching irrigation is often also required in times of little or no rainfall. The following are basic guidelines that might form the basis for successful citrus irrigation management.

- Regular flushing irrigations to achieve root zone leaching (duration of at least 6 hours every 7-10 days) when TDS values regularly exceed 1,200 ppm or during periods of little or no rainfall.
- Maintenance of any water furrows, ditches, or canals to ensure that the grove space is drained properly.
- Avoid using fertilizers whose components have high salt indexes. If using dry fertilizer, rely upon split-applications as frequently as possible. If fertigating, rely on low-volume, low-concentration applications with frequent cycles.
- Rootstock selection can have significant implications regarding salinity management: 'Swingle,' 'Carrizo,' and rough lemon are relatively more sensitive to salt; although all citrus is susceptible to salinity-associated toxicity.





**Figure 1. Symptoms of salt damage (yellowing and desiccation) to citrus foliage.**

Table 1. Salt index of some fertilizer sources

<b><u>Material and Analysis</u></b>	<b>Salt Index per unit (20 lb) of plant nutrient</b>
<b>Nitrogen</b>	
Ammonia, 82.2% N	0.572
Ammonium nitrate, 33.5% N	2.990
Ammonium sulfate, 21.2% N	3.253
Ammonium nitrate, 20.5% N	2.982
Calcium nitrate, 15.5%	4.194
Sodium nitrate, 16.5% N	6.060
Urea, 46.6% N	1.618
<b><u>Phosphorus</u></b>	
Normal superphosphate, 20% P <sub>2</sub> O <sub>5</sub>	0.390
Concentrated superphosphate, 45% P <sub>2</sub> O <sub>5</sub>	0.224
Concentrated superphosphate, 48% P <sub>2</sub> O <sub>5</sub>	0.210
Monoammonium phosphate, 12.2% N, 61.7% P <sub>2</sub> O <sub>5</sub>	0.405
Diammonium phosphate, 18% N, 46% P <sub>2</sub> O <sub>5</sub>	0.456
<b><u>Potassium</u></b>	
Potassium chloride, 60% K <sub>2</sub> O	1.936
Potassium nitrate, 13.8% N, 46.6% K <sub>2</sub> O	1.219
Potassium sulfate, 46% K <sub>2</sub> O	0.853
Monopotassium phosphate, 52.2% P <sub>2</sub> O <sub>5</sub> , 34.6% K <sub>2</sub> O	0.097
Sulfate of potash-magnesia, 21.9% K <sub>2</sub> O, 10.8% Mg	1.971

**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 **Fax to 863 674 4636** or E-mail to [maz@ufl.edu](mailto:maz@ufl.edu) Thank you for your input!!!

Please circle or bold your answer

- |   |   |     |                                    |              |
|---|---|-----|------------------------------------|--------------|
| 1 | Was the information up to date and accurate?                    | Yes | No                                 | Uncertain    |
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| 5 | Have you had an opportunity to use the information?             | Yes | No                                 | Uncertain    |
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| 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?

- |                          |                         |                        |
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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

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

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### *Racial-Ethnic Background*

American Indian or native Alaskan  
 Asian American  
 Hispanic

White, non-Hispanic  
 Black, non-Hispanic

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Male