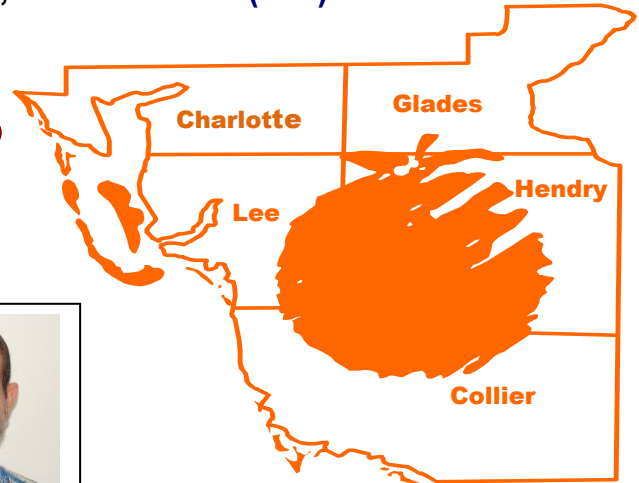


Hendry County Extension, P.O. Box 68, LaBelle, FL 33975 (863) 674 4092

Flatwoods Citrus



Vol. 26, No. 3

March 2023

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



Mongi Zekri

Table of Contents

Citrus Statistics	2-3
29 March 2023 Citrus Workshop	4
CORE CEUs for Pesticide License Renewal	4
Florida Citrus Production Guide	5
Flatwoods Citrus Newsletter Sponsors – Thank you!	6-8
El Niño/Southern Oscillation (ENSO) Diagnostic Discussion	9
Citrus Black Spot	10-11
Importance of Sprayer Calibration	12
Importance of Fertilizer Spreader Calibration and Maintenance	13
Nutrition of Citrus Trees	14-16
Microsprinkler Irrigation & Fertigation	17
Mobile Irrigation Lab	18
Certified Pile Burner Class	19-23

The Institute of Food and Agricultural Sciences (IFAS) is an Equal Employment Opportunity – Affirmative Action Employer authorized to provide research, educational information and other services only to individuals and institutions that function without regard to race, color, sex, age, handicap or national origin.

U.S. DEPARTMENT OF AGRICULTURE, COOPERATIVE EXTENSION SERVICE, UNIVERSITY OF FLORIDA, IFAS, FLORIDA A. & M. UNIVERSITY COOPERATIVE EXTENSION PROGRAM, AND BOARDS OF COUNTY COMMISSIONERS COOPERATING.



United States Department of Agriculture
National Agricultural Statistics Service



CITRUS MARCH FORECAST MATURITY TEST RESULTS AND FRUIT SIZE

Cooperating with the Florida Department of Agriculture and Consumer Services
851 Trafalgar Ct, Suite 310E, Maitland, FL 32751-4132
(407) 648-6013 · (855) 271-9801 FAX · www.nass.usda.gov/fl

March 8, 2023

Florida All Orange Production Up 1 Percent from February Forecast
Florida Non-Valencia Orange Production Up 2 Percent
Florida Valencia Orange Production Unchanged
Florida All Grapefruit Production Up 7 Percent
Florida All Tangerine and Tangelo Production Unchanged

FORECAST DATES - 2022-2023 SEASON	
April 11, 2023	June 9, 2023
May 12, 2023	July 12, 2023

Citrus Production by Type – States and United States

Crop and State	Production ¹		2022-2023 Forecasted Production ¹	
	2020-2021 (1,000 boxes)	2021-2022 (1,000 boxes)	February (1,000 boxes)	March (1,000 boxes)
Non-Valencia Oranges ²				
Florida	22,700	18,250	6,000	6,100
California ³	41,300	31,800	38,000	38,000
Texas ³	1,000	170	900	900
United States	65,000	50,220	44,900	45,000
Valencia Oranges				
Florida	30,250	22,800	10,000	10,000
California	7,700	8,600	8,100	8,100
Texas ³	50	30	250	250
United States	38,000	31,430	18,350	18,350
All Oranges				
Florida	52,950	41,050	16,000	16,100
California	49,000	40,400	46,100	46,100
Texas ³	1,050	200	1,150	1,150
United States	103,000	81,650	63,250	63,350
Grapefruit				
Florida-All	4,100	3,330	1,500	1,600
Red	3,480	2,830	1,320	1,440
White	620	500	180	160
California ³	4,200	4,100	4,300	4,300
Texas ³	2,400	1,700	2,200	2,200
United States	10,700	9,130	8,000	8,100
Lemons ³				
Arizona	750	950	1,500	1,500
California	20,100	24,900	22,000	22,000
United States	20,850	25,850	23,500	23,500
Tangerines and Mandarins				
Florida	890	750	500	500
California ^{3,4}	28,800	17,400	22,000	22,000
United States	29,690	18,150	22,500	22,500

¹ Net pounds per box: oranges in California-80, Florida-90, Texas-85; grapefruit in California and Texas-80, Florida-85; lemons-80; and tangerines and mandarins in California-80, Florida-95.

² Navel and miscellaneous varieties in California. Early (including Navel) and midseason varieties in Florida and Texas.

³ Estimates for current month carried forward from previous forecast.

⁴ Includes tangelos and tangors.

All Oranges 16.1 Million Boxes

The 2022-2023 Florida all orange forecast released today by the USDA Agricultural Statistics Board is 16.1 million boxes, increased 100,000 boxes from the February forecast. If realized, this will be 61 percent less than last season's final production. The forecast consists of 6.10 million boxes of non-Valencia oranges (early, mid-season, and Navel varieties) and 10.0 million boxes of Valencia oranges. A 9-year regression has been used for comparison purposes. All references to "average", "minimum", and "maximum" refer to the previous 10 seasons, excluding the 2017-2018 season, which was affected by Hurricane Irma. Average fruit per tree includes both regular and first late bloom.

Non-Valencia Oranges 6.10 Million Boxes

The forecast of non-Valencia production is increased by 100,000 boxes to 6.10 million boxes. The Row Count survey conducted February 22-23, 2023, showed 94 percent of the early and mid-season non-Valencia rows, excluding Navels, are harvested. Estimated utilization for non-Valencia oranges (including Navels) to March 1, with an allocation for non-certified fruit, is 6.09 million boxes. The Navel forecast, included in the non-Valencia portion of the forecast is 240,000 boxes.

Valencia Oranges 10.0 Million Boxes

The forecast of Valencia production is unchanged from the February forecast and remains at 10.0 million boxes. Current fruit size is below the minimum and is projected to be below the minimum at harvest, requiring 277 pieces to fill a 90-pound box. Current droppage is above the maximum and projected to be above the maximum at harvest. Harvest of Valencia oranges is still in the early stages.

All Grapefruit 1.60 Million Boxes

The forecast of all grapefruit production is increased 100,000 from February to 1.60 million boxes. The red grapefruit forecast is increased to 1.44 million boxes. The white grapefruit forecast is lowered 20,000 boxes to 160,000 boxes. The Row Count survey conducted February 22-23, 2023, indicated 72 percent of grapefruit rows are harvested. Estimated utilization to March 1 for all grapefruit, with an allocation for non-certified fruit 1.56 million boxes.

Tangerines and Tangelos 500,000 Boxes

The forecast for tangerines and tangelos is unchanged from the February forecast and is 500,000 boxes, 33 percent less than last season's utilization of 750,000 boxes. This forecast number includes all certified tangerine and tangelo varieties.

Reliability

To assist users in evaluating the reliability of the March 1 Florida production forecasts, the "Root Mean Square Error," a statistical measure based on past performance, is computed. The deviation between the March 1 production forecast and the final estimate is expressed as a percentage of the final estimate. The average of squared percentage deviations for the latest 20-year period is computed. The square root of the average becomes statistically the "Root Mean Square Error." Probability statements can be made concerning expected differences in the current forecast relative to the final end-of-season estimate, assuming that factors affecting this year's forecast are not different from those influencing recent years.

The "Root Mean Square Error" for the March 1 Florida all orange production forecast is 4.8 percent. If you exclude the three abnormal production seasons (three hurricane seasons), the "Root Mean Square Error" is 5.0 percent. This means chances are 2 out of 3 that the current all orange production forecast will not be above or below the final estimates by more than 4.8 percent, including abnormal seasons, or 5.0 excluding abnormal seasons. Chances are 9 out of 10 (90 percent confidence level) that the difference will not exceed 8.3 percent including abnormal seasons or 8.8 percent excluding abnormal seasons.

Changes between the March 1 Florida all orange forecast and the final estimates during the past 20 years have averaged 3.83 million boxes (3.94 million, excluding abnormal seasons), ranging from 0.05 million boxes to 10.7 million boxes including abnormal seasons, (0.15 to 10.7 million boxes excluding abnormal seasons). The March 1 forecast for all oranges has been below the final estimate 7 times, above 13 times, (below 6 times, above 11 times, excluding abnormal seasons). The difference does not imply that the March 1 forecasts this year are likely to understate or overstate final production.

In-Person and Via Zoom Citrus Workshop

March 2023 Citrus Workshop

Location: SW Florida Research & Education Center, Immokalee

Date and time: Wednesday, March 29, 2023, 11:00 AM – 12:00 Noon

Program Sponsor: **Sarah Markle with Valent**

Pre-registration is required. No registration fee and lunch is free Thanks to Sarah Markle with Valent.

To register and attend in-person, and reserve lunch, send me an e-mail (maz@ufl.edu).

To register and attend via Zoom, here is the Zoom link:

<https://ufl.zoom.us/j/93775867321?pwd=ZThSYi9EN3ZmSndqenJRckxGbTFqUT09>

After registering, you will receive a confirmation email containing information about joining the Zoom meeting.

Title: Getting a head start for summer weed control: What works best in citrus?

Speaker: Dr. Ramdas Kanissery, Assistant Professor in Weed Science, UF-IFAS Southwest Florida Research and Education Center, Immokalee.

Weed control is often tricky in Florida citrus throughout the year; however, it is even more challenging during summer as weeds love hot and rainy weather. The talk will provide tips to help create the best strategies to minimize weeds in the groves during summer.

Summer is also the best time to prevent widespread weed infestations in citrus groves later into the year. Growers will get better control and more bang for the buck with a good weed management program in late spring or early summer than if they wait until mid-summer, when weeds such as Spanish needles, guinea grass, etc., get larger, tougher, and have set seeds that will keep the weed control difficult for years to come.

Coordinator: Dr. Mongi Zekri, UF-IFAS, maz@ufl.edu

1 CEU for pesticide license renewal

1 CEU for certified crop advisors

CEUs for pesticide license renewal

Earn CORE CEUs online through Southeast AgNet & Citrus Industry magazine

<http://citrusindustry.net/ceu/>

The following series of articles and quizzes are available with their expiration dates noted:

- **2023 #1:** Key Terms to Know When Using Pesticides (1/31/24)
- **2022 #4:** Making Sense of Pesticide Formulations (10/31/23)
- **2022 #3:** Agricultural Pesticide Licensing: Frequently Asked Questions (7/31/23)
- **2022 #2:** How Weather Affects Pesticide Applications (4/30/23)

Each article grants one General Standards (Core) CEU when submitted and approved toward the renewal of a Florida Department of Agriculture and Consumer Services restricted-use pesticide license.

<https://crec.ifas.ufl.edu/resources/production-guide/>

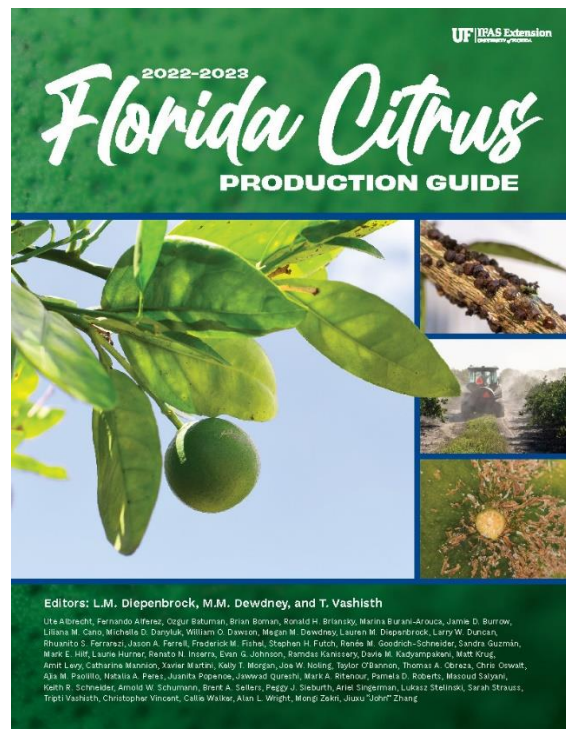
The objective of the Florida Citrus Production Guide is to assist citrus growers in the identification of pest management options and the selection of appropriate control measures. This publication should serve as a reference once it has been determined that control measures might be warranted. It is not intended to replace pesticidal product labels which contain important usage information and should be immediately accessible for reference. Violations of directions for use printed on the label are against State and Federal laws. Care should be taken to select only those treatments best suited for control of the specific pest(s) identified as requiring suppression. Products listed in all tables have been shown to be efficacious, non-phytotoxic to citrus, and relatively safe on non-target arthropods and microorganisms when used as directed. However, it is important to realize that results may not be consistent under different environmental, application, and tank mix conditions.

PRODUCTION GUIDE MENU

- [General](#)
- [Horticultural Practices](#)
- [Mites, Insects & Nematodes](#)
- [Diseases](#)
- [Weeds](#)
- [Pesticides](#)

If you did not pick up your hard copy of the newly updated Florida Citrus Production Guide at the Citrus Expo, you can find the electronic version online <https://crec.ifas.ufl.edu/resources/production-guide/>

If you need hard copies, you can get them free from your Citrus Extension Agent or from the Citrus Research & Education Center in Lake Alfred and the Southwest Florida Research and Education Center in Immokalee.



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



Sam Thayer
President

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

www.maxijet.com
sam@maxijet.com

The Standard of Quality In Low-Volume Irrigation



Frank Miele

Office: 863 357 0400

Cell: 954 275 1830

Fax: 863 357 1083

E-mail: famiele1@aol.com



Brad Lang

Territory Sales Manager

Phone: 229 894 0568

brad.lang@nufarm.com

MIKE HERRINGTON
863-412-2067
MikeH@amvac.com

CITRUS FIX™ • Krovar® DF • DIBROM®
B Sure® • DEADLINE® • ECOZIN®

Clint Wise Jr.
AGLIME SALES, INC.

P.O. Box 60

Babson Park, FL 33827

863-241-9007

clint.wise@aglimesales.com

Justin Newsome

syngenta

Mobile: 863 221 9681

justin.newsome@syngenta.com

www.syngenta.com



**FLORIDA COAST
EQUIPMENT**

Matt Horak

C: 813-893-9862

E: MHorak@FloridaCoastEq.com

<https://floridacoasteq.com>

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



863-439-2877
www.TheTreeDefender.com
PATENTED: U.S. PATENT No. 11,122,752



AGRICULTURAL
RISK MANAGEMENT LLC
Growing with you!

Trevor Troyer
Office: 239 789 4742
Cell: 239 810 0138
E-mail: ttroyer@agriskmgmt.com
www.agriskmgmt.com



BLACKSMITH
BIOSCIENCE

Jack Kilgore
Technical Sales Rep, SE US

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

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

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

Heath Prescott



Toll Free: 800 433 7117
Mobile: 863 781 9096
heath@keyplex.com

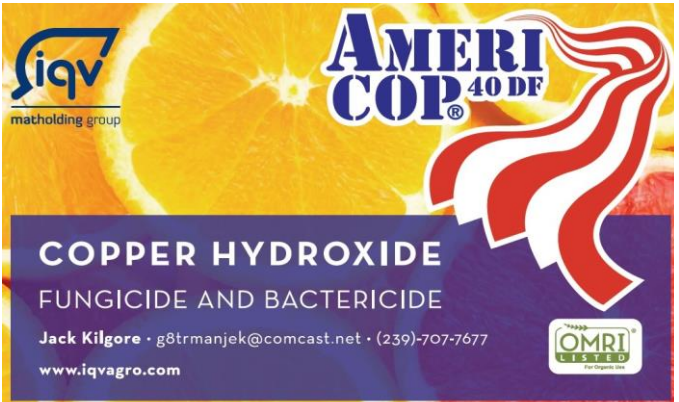


Plant Food Systems, Inc.
P.O. Box 775
Zellwood, FL 32798
Tel: 407 889 7755

POLYON® Controlled-Release fertilizer makes you more efficient. *Ask me how!*

POWERED BY
POLYON
 Controlled-Release Fertilizer

Trey Whitehurst (863)-633-8711
www.harrells.com



AMERI COP^{40 DF}

COPPER HYDROXIDE FUNGICIDE AND BACTERICIDE

Jack Kilgore • g8trmanjek@comcast.net • (239)-707-7677
www.iqvagro.com

OMRI LISTED

NOT ALL LIQUID COPPERS ARE CREATED EQUAL

Badge^{SC}
 Fungicide/Bactericide

BART HOOPINGARNER
941.737.7444
BHOOPINGARNER@GOWANCO.COM

Badge^{SC} is a registered trademark of Isagro USA, Inc. Always read and follow label directions.

Gowan
 ISAGRO USA GOWANCO.COM

FMC Corporation

Daren Sapp, 863 840 4600
Daren.sapp@fmc.com

Brent Johnson, 941 243 3379
Dennis.Johnson@fmc.com

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

EL NIÑO/SOUTHERN OSCILLATION (ENSO) DIAGNOSTIC DISCUSSION

issued by

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

9 February 2023

CLIMATE PREDICTION CENTER/NCEP/NWS

ENSO Alert System Status: [La Niña Advisory](#)

Synopsis: ENSO-neutral conditions are expected to begin within the next couple of months, and persist through the Northern Hemisphere spring and early summer.

Although a weak La Niña was still apparent during January, below-average sea surface temperatures (SSTs) continued to weaken further across the equatorial Pacific Ocean [Fig. 1]. The latest weekly Niño index values were mostly near -0.5°C , with the exception of Niño-1+2 which was $+0.1^{\circ}\text{C}$ [Fig. 2]. Like the surface, negative subsurface temperature anomalies continued to weaken [Fig. 3], with above-average subsurface temperatures expanding eastward at depth and near the surface of the eastern Pacific Ocean [Fig. 4]. Low-level easterly wind anomalies continued, but were confined to the western and central Pacific Ocean. Upper-level westerly wind anomalies were evident over the east-central Pacific. Suppressed convection persisted over the western and central tropical Pacific, while enhanced convection was observed over western Indonesia [Fig. 5]. Overall, the coupled ocean-atmosphere system continued to reflect La Niña.

The most recent IRI plume predicts a transition from La Niña to ENSO-neutral in the next couple of months [Fig. 6]. The forecaster consensus is largely in agreement. ENSO-neutral is expected to prevail during the spring and early summer. There are increasing chances of El Niño at longer forecast horizons, though uncertainty remains high because of the spring prediction barrier, which typically is associated with lower forecast accuracy. In summary, ENSO-neutral conditions are expected to begin within the next couple of months, and persist through the Northern Hemisphere spring and early summer [Fig. 7].

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](#)). Additional perspectives and analysis are also available in an [ENSO blog](#). A probabilistic strength forecast is [available here](#). The next ENSO Diagnostics Discussion is scheduled for 9 March 2023.

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.

**Climate Prediction Center
National Centers for Environmental Prediction
NOAA/National Weather Service**

CITRUS BLACK SPOT fungal disease causes fruit blemishes and fruit drop especially on sweet oranges.



Lemons are the most susceptible, but sweet oranges, especially mid to late maturing types such as Valencia, are highly susceptible to this disease. Hamlin sweet oranges and tangerine/mandarin types are moderately susceptible. Grapefruit is thought to be moderately susceptible and symptoms have been seen in Florida.

Black spot fruit symptoms are wide ranging and have many different names. Hard spot is the most diagnostic symptom of black spot. Lesions are nearly circular, depressed, with gray necrotic tissue at the middle, and a brick-red to black margin that can be cracked around the

edges. Significant fruit drop is a common symptom in heavily infected groves. Airborne ascospores produced in decomposing leaf litter on the grove floor are the source of the primary inoculum for black spot. They are blown into the canopy by wind. These spores germinate and directly infect the leaves and fruit. Major ascospore release usually occurs from April to early September, with favorable infection conditions from May through September. Fruit remains susceptible most of the growing season. Monthly fungicide applications of copper and/or strobilurins (Abound, Gem, or Headline) will be needed from early May to mid-September to control black spot. If there is substantial rain in April, starting fungicide applications in April is advised. Since only four strobilurin fungicides can be used in a season for any purpose, it is recommended for fresh fruit to reserve strobilurin fungicides for times when phytotoxicity from copper applications is a concern (temperatures >90°F). For processing fruit, strobilurins can be used earlier in the season, and applications for greasy spot and melanose can be combined. It is recommended that strobilurin fungicides not be applied in two consecutive sprays to manage pathogen resistance. Currently, we do not have any other rotational fungicides for resistance management.

In addition to chemical control measures, practices to accelerate leaf litter decomposition beneath the trees to reduce the ascospore inoculum may be beneficial. Enhancing leaf litter degradation should commence in mid-March. There are three methods that have reduced the ascospore inoculum of *Mycosphaerella citri*, the fungus that causes greasy spot. The first is to increase the microsprinkler irrigations to at least 5 times a week for approximately a ½ hour per irrigation period for 1.5 months. The leaf litter decomposition will be greater compared to that with the

traditional irrigation frequency. A drawback is that leaf litter reduction will be confined to the areas where the microsprinklers reach. A second method is to apply urea (187 lb/treated acre) or ammonium sulfate (561 lb/acre) to the leaf litter. The final method is to apply dolomitic lime or calcium carbonate (2226 lb/treated acre) to the leaf litter. The decay rate is greater for litter treated with lime and inoculum production is reduced. All treatments worked equally well with *M. citri* and there is no indication that one method is better than another. Lime or irrigation methods should not be used in conjunction with the high N treatments, since they have opposite methods of action.

Care must be exercised in handling and moving citrus fruit, leaves, twigs and debris from citrus black spot (CBS) Quarantined Areas, since the disease

may be easily and unwittingly spread to other citrus trees, nurseries or groves. There are many rules and regulations that **Growers, Harvesters, Haulers, Processing, Packing Facilities and Haulers have to be aware of with relation to the black spot disease in Florida. For more information, go to: <https://crec.ifas.ufl.edu/extension/pest/PDF/Citrus%20Black%20Spot.pdf>**

READ THE LABEL.

See Table 1.

Rates for pesticides are given as the maximum amount required to treat mature citrus trees unless otherwise noted. To treat smaller trees with commercial application equipment, including handguns, mix the per-acre rate for mature trees in 250 gallons of water. Calibrate and arrange nozzles to deliver thorough distribution and treat as many acres as this volume of spray allows.

Table 1.
Recommended Chemical Controls for Citrus Black Spot

Pesticide	FRAC MOA²	Mature Trees Rate/Acre¹
copper fungicide	M 01	Use label rate.
Enable 2F	3	8.0 fl/oz. Do not apply more than 24 oz/acre/season
Abound	11	9.0-15.5 fl oz. Do not apply more than 92.3 fl oz/acre/season for all uses. Best applied with petroleum oil.
Gem 500 SC	11	1.9-3.8 fl oz. Do not apply more than 15.2 fl oz/acre/season for all uses. Best applied with petroleum oil. Do not apply within 7 days of harvest.
Headline SC	11	12-15 fl oz. Do not apply more than 54 fl oz/acre/season for all uses. Best applied with petroleum oil.
Pristine	11 + 7	16-18.5 oz. No more than 74 oz/acre/season
Amistar Top	11 + 3	15.4 fl oz. Do not apply more than 61.5 fl oz/acre/year

<https://edis.ifas.ufl.edu/pdf/CG/CG088/CG088-D4jbgvp5b.pdf>

IMPORTANCE OF SPRAYER CALIBRATION

Sprayers must be checked to ensure all nozzles are applying pesticides uniformly and at the correct rate. Make sure your equipment is working properly and calibrated to ensure the correct amount of pesticide is delivered to the target area.

Pesticide application, greater than the label rate, is illegal and can result in needless risk to groundwater, increased production costs, and crop damage. Under-application might be costly by not properly controlling the target pest. Although you can sometimes repeat the application, doing so is time-consuming, costs more, increases the risk of applying too much and increases the risk in pesticide resistance.

Regular sprayer calibration includes measuring the output of each nozzle to ensure all nozzles are functioning properly. Specific calibration guides are available from a number of sources. Sprayer calibration should be done every time a different pesticide is applied or at least once each season.

The rate of application depends partly on the particle or droplet size, texture, and other properties of the pesticide being applied. Use only water during the test if the pesticide is a liquid. Contact the manufacturer to get reliable information regarding carrier material to perform the tests if the pesticide is a dust, granule, or fumigant, or a liquid diluted with a liquid other than water.

Follow calibration and mixing instructions carefully. Mixing, loading, and calibration methods must also conform to the speed of the application machinery. Moving too fast or too slow changes the rate of application.

Minimizing spray drift

Spray drift, movement of a pesticide through air during or after application to a site other than the intended site of application is a challenging issue facing pesticide applicators. Complete elimination of spray drift is impossible. However, drift can be minimized by following these control measures:

1. Read and follow the pesticide label.
2. Select low or nonvolatile pesticides.
3. Use spray additives following label guidelines.
4. Use large orifice sizes for spray nozzles.
5. Avoid high sprayer pressures, which create finer droplets.
6. Use drift reduction nozzles.
7. Use wide-angle nozzles, lower spray boom heights, and keep spray boom stable.
8. Do not spray when wind speeds exceed 10 mph and when wind direction is directed toward sensitive vegetation.
9. Use a shielded spray boom when wind conditions exceed preferred conditions.
10. Avoid spraying on extremely hot and dry days, especially if sensitive vegetation is nearby.
11. Keep good records and evaluate the results.



IMPORTANCE OF FERTILIZER SPREADER CALIBRATION AND MAINTENANCE

Properly calibrated and maintained equipment ensures a more uniform distribution of nutrients. This, combined with other conservation practices, reduces production costs, soil surface runoff, and nutrient movement to nearby surface waters. Spreaders that have not been properly maintained and calibrated will have problems delivering accurate rates and evenly distributed fertilizer amounts to the grown crop.

Calibration

Calibration is the process used to help ensure that the equipment applies proper rates of the selected product. Proper calibration is the key to successful fertilizer use efficiency. Failure to calibrate equipment can result in ineffective applications. Applying too much is costly, unlawful and may cause crop injury. Applying too little can result in poor crop growth and production. It is important to calibrate equipment on a regular basis to compensate for variations. The equipment will become worn or damaged with use and result in inaccurate output and spread pattern.

Two items must be considered when calibrating a spreader. The first is the distribution pattern of the spreader. The second is the product application rate, which is the amount of product applied per acre. There are many factors that affect the distribution pattern of a rotary spreader and some of them relate directly to the product. For this reason, it is recommended that the spreader be calibrated separately for every product to be applied. Spreader calibration should be checked more often when the spreader is used frequently.

Product & application

Choose a product according to the need of the crop. Before applying the product, read the spreader manual. The spreader manual will usually indicate proper settings for various application rates. However, calibration still needs to be performed to ensure the settings are accurate and to compensate for wear and variations in equipment. Be sure that the proper procedures and application rates are followed. Check the 'spread pattern' and amount being applied. The physical properties of dry fertilizer can vary widely. Since larger particles are thrown further than small particles, a product of uniform size should be used to achieve a consistent application pattern. It is essential to maintain a constant speed when using a rotary spreader to obtain uniform and accurate distribution.

Maintenance and Cleaning

Proper care and maintenance will help retain precise applications and prolong the life of spreaders. Manufacturer's directions on cleaning and lubricating should be followed. With the shutter or gate wide open, remove all granules from the spreader at the end of each application. Then, the spreader should be thoroughly washed and allowed to dry. Hot water may help break loose fertilizer which is caked on. Finally, lubricate the spreader according to instructions. Spreaders should be stored in a clean, dry place out of direct sunlight.



NUTRITION OF CITRUS TREES

Fertilizer management should include calibration and adjustment of fertilizer spreaders, booms, pumps, or irrigation systems to accurately deliver fertilizer rates and place fertilizers within the tree rootzone. To increase fertilizer efficiency, soil and leaf analysis data should be studied and taken into consideration when generating a fertilizer program and selecting a fertilizer formulation. For citrus trees in the citrus greening (HLB) era, soluble fertilizer should be split into 6-10 applications per year with a complete balanced fertilizer. Besides nitrogen, phosphorus, and potassium, be sure that the fertilizer has magnesium, and micronutrients such as manganese, zinc, iron, and boron. The use of controlled release fertilizer or frequent fertigation is preferred. For mature trees, the highest nutrient requirement extends from late winter through early summer. This coincides with flowering, heavy spring flush, fruit set, and fruit development and expansion. For best fresh fruit quality, nutritional requirements, particularly nitrogen (N), should decrease late in the summer and fall. Based on tree demands, 2/3 to 3/4 of the yearly fertilizer amount should be applied between February and June. In warm areas such as southwest Florida where tree growth can continue certain years during the winter, fertilizer applications should also be made in the fall to satisfy vegetative growth demand. However, fall fertilizer applications may sometimes delay fruit color development and fruit maturity for early and mid-season cultivars. Foliar applications of micronutrients should be applied at least 3 times a year on the major spring, summer, and fall flushes when the new leaves are about fully expanded. Foliar spray applications of 3-5 lbs/acre of magnesium, manganese, zinc, and copper, and 0.25-0.50 lb/acre of boron and molybdenum are also recommended on each of the three major flushes of citrus trees to prevent nutrient deficiencies, cope with HLB, and improve production. Sulfate forms are less expensive and nitrate forms appear to facilitate the uptake of micronutrients.

IFAS fertilizer guidelines for nonbearing citrus trees

Year in grove	Lb N/tree/year (range)	Lbs Fertilizer/tree/year (range)		Lower limit of application frequency	
		6-6-6	8-8-8	Dry	Fertigation
1	0.15 – 0.30	2.5-5.0	1.9-3.8	6	10
2	0.30 – 0.60	5.0-10.0	3.8-7.5	6	10
3	0.45 – 0.90	7.5-15.0	5.6-11.3	6	10

IFAS fertilizer guidelines for bearing citrus trees (4 years and older)

Oranges	Grapefruit	Other varieties	Lower limit of application frequency	
Lbs N/acre/year (range)			Dry	Fertigation
120 - 200	120 - 160	120 – 200	6	10

For more information on citrus nutrition, get to the following EDIS publications:

[Increasing Efficiency and Reducing Costs of Citrus Nutritional Programs](#)

Mongi Zekri, Thomas Obreza and Arnold Schumann
<http://edis.ifas.ufl.edu/SS442> [pdf]

[Irrigation, Nutrition, and Citrus Fruit Quality](#)

Mongi Zekri, Thomas A. Obreza and Robert Koo
<http://edis.ifas.ufl.edu/SS426> [pdf]

[Fertigation Nutrient Sources and Application Considerations for Citrus](#)

Brian Boman and Tom Obreza
<http://edis.ifas.ufl.edu/CH185> [pdf]

[Citrus Fertilizer Management on Calcareous Soils](#)

Thomas A. Obreza, Mongi Zekri, and David V. Calvert
<http://edis.ifas.ufl.edu/CH086> [pdf]

Boron and chlorine for citrus trees. UF Coop Ext. Ser.

Zekri, M. and T.A. Obreza.
<http://edis.ifas.ufl.edu/pdffiles/SS/SS61900.pdf>

Molybdenum and nickel for citrus trees. UF Coop Ext. Ser.

Zekri, M. and T.A. Obreza.
<http://edis.ifas.ufl.edu/pdffiles/SS/SS61800.pdf>

Iron and copper for citrus trees. UF Coop Ext. Ser. Zekri, M. and T.A. Obreza.

<http://edis.ifas.ufl.edu/pdffiles/SS/SS61700.pdf>

Manganese and zinc for citrus trees. UF Coop Ext. Ser.

Zekri, M. and T.A. Obreza.
<http://edis.ifas.ufl.edu/pdffiles/SS/SS61600.pdf>

Nitrogen (N) for citrus trees. UF Coop Ext. Ser.

Zekri, M. and T.A. Obreza.
<http://edis.ifas.ufl.edu/pdffiles/SS/SS58000.pdf>

Phosphorus (P) for citrus trees. UF Coop Ext. Ser.

Zekri, M. and T.A. Obreza.
<http://edis.ifas.ufl.edu/pdffiles/SS/SS58100.pdf>

Potassium (K) for citrus trees. UF Coop Ext. Ser.

Zekri, M. and T.A. Obreza.
<http://edis.ifas.ufl.edu/pdffiles/SS/SS58300.pdf>

Magnesium (Mg) for citrus trees. UF Coop Ext. Ser.

Zekri, M. and T.A. Obreza.
<http://edis.ifas.ufl.edu/pdffiles/SS/SS58200.pdf>

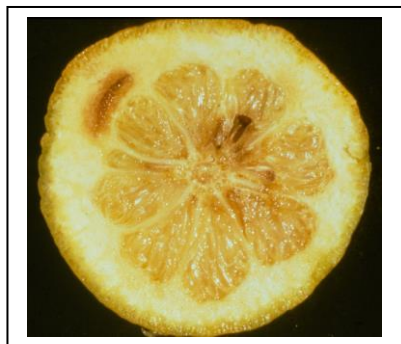
Calcium (Ca) and sulfur (S) for citrus trees. UF Coop Ext. Ser.

Zekri, M. and T.A. Obreza.
<http://edis.ifas.ufl.edu/pdffiles/SS/SS58400.pdf>

Boron (B)

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

Boron deficiency is known as “hard fruit” because the fruit is hard and dry due to lumps in the rind caused by gum impregnation. The chief fruit symptoms include premature shedding of young fruits. Such fruit have brownish discoloration in the white portion of the rind (albedo), described as gum pockets or impregnations of the tissue with gum and unusually thick albedo. Older fruit are undersized, lumpy, misshaped with an unusually thick albedo containing gum deposits. Seed fails to develop and gum deposits are common around the axis of the fruit.



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



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

To treat citrus affected with B deficiency, B compounds can be applied either foliarly or in the fertilizer. As a maintenance program, apply B in the fertilizer at an annual rate equivalent to 1/200 of the N rate. In Florida, foliar spray applications have been found much safer and more efficient than soil application. Soil applications frequently fail to give satisfactory results during dry falls and springs and may result in toxicity problems if made during the summer rainy season. Boron solubility in the soil is reduced at soil pHs below 5 and above 7. Foliar spray may be applied during the dormant period through post bloom, but preferably during early flower development. Treating at this growth stage is important because boron does not move very readily from other parts of the tree to the buds. Applying boron at this time will assist in flower initiation and pollen production, satisfy the needs for pollen tube growth, and enhance fruit set. Boron levels in the leaf tissue should not drop below 40 ppm or exceed 120 ppm (dry wt basis). Where deficiency symptoms are present, double the amount suggested. Use care not to apply more than the recommended amount because it is easy to go from deficiency to excess.

MICROSPRINKLER IRRIGATION & FERTIGATION

Microsprinkler irrigation is an important component of citrus production systems in Florida. Microirrigation is more desirable than other irrigation methods for several reasons. Three important advantages are: water conservation, the potential for significantly improving fertilizer management and for cold protection.

Research has shown that when properly managed (no overirrigation), water savings with microirrigation systems can amount to as much as 80% compared with subirrigation and 50% compared with overhead sprinkler irrigation.



Microirrigation provides for precise timing and application of fertilizer nutrients in citrus production. Fertilizer can be prescription-applied during the season in amounts that the tree needs and at particular times when those nutrients are needed. This capability helps growers increase the efficiency of fertilizer application and should result in reduced fertilizer applications for citrus production. Research has also shown the important advantage of microsprinklers for freeze protection of citrus.

Fertigation is the timely application of small amounts of fertilizer through irrigation systems directly to the root zone.

Some advantages of fertigation:

- ◆ Fertilizer is placed in the wetted area where feeder roots are extensive,
- ◆ Fertilizer may be applied more frequently in small amounts so that it is available when the tree needs it,
- ◆ Increased fertilizer application frequency can increase fertilizer efficiency and reduce leaching,
- ◆ Application cost is much lower than that of dry or foliar fertilizer application.

Through fertigation, comparable or better yields and quality can be produced with less fertilizer.

Microirrigation systems must be properly maintained to apply water and fertilizer uniformly. Growers must determine:

- (1) which fertilizer formulations are most suitable for injection,
- (2) the most appropriate fertilizer analysis for different age trees and specific stages of growth,
- (3) the amount to apply during a given fertigation event, and
- (4) the timing and frequency of applications.

Properly managed applications of plant nutrients through irrigation systems significantly enhance fertilizer efficiency while maintaining or increasing yield. On the other hand, poorly managed fertigation may result in substantial yield losses. Fertigation involves deciding which and how much nutrients to apply, selecting the most effective formulations and scheduling injections to ensure that essential nutrients are available as needed.

Injection Duration

A minimum injection time of 45 to 60 minutes is recommended. This time is sufficient for uniform distribution of nutrients throughout the fertigation zone. Limit injection time to prevent the application of too much water, because excessive water leaches plant nutrients below the root zone.

MOBILE IRRIGATION LAB

The Agricultural MIL is a FREE service that serves Florida. For an Agricultural MIL evaluation in Southwest Florida, call **1 800 492 7862 (FL only), ext. 6119**
(239) 322-8373
(239) 997 7331
(239) 455-4100

Assisting the agricultural community by improving irrigation efficiency and conserving water.



The Lower West Coast Mobile Irrigation Lab (MIL) is a cooperative project of the Collier Soil & Water Conservation District, the Natural Resources Conservation Service, and the Florida Department of Agriculture and Consumer Services. The program began in 1987 to assist the District in meeting its statutory responsibilities and to assist growers with water conservation.

The Mobile Irrigation Lab is a free volunteer service to the agricultural community. Any grower can contact the District to arrange a free evaluation. It was expanded to help growers meet water use permit conditions. District staff has used high pumpage reports to identify users who might wish to voluntarily reduce water use before a resource problem or permit violation occurs.

A trained technician is invited to a grower's field and collects irrigation system and specific field data. System pressure and irrigation uniformity data are then reviewed and computer-analyzed. A report provides recommendations for improvements and irrigation schedules. If needed, the technician assists the local NRCS office in the redesign of the system.

An irrigation schedule offers a general guide to determine when and how much to irrigate based on system efficiency, crop requirements and soil characteristics.

In addition to the benefits of free irrigation evaluations, water conservation and water quality improvements, the program shares valuable technology and information with growers.

Mobile Irrigation Lab data suggests that most evaluated systems are already at or above permitted efficiency standards. With only minor improvements, about half the sites below these standards could easily meet them. Typically, if all recommendations are implemented, overall system irrigation efficiency can improve by an estimated 17 percent — helpful to any grower's bottom line, as well as the region's water resources.





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 **Tuesday, April 11, 2023**. 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 (FFS) 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 your 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: University of Florida 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 with a check as directed.

**Sincerely,
Mongi Zekri**

Registration Form

Florida's Certified Pile Burner Program
Tuesday, April 11, 2023

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

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

Please send this form and a check for \$50.00 made payable to:
University of Florida

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

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

Name

Mailing address

Email address

Phone Number

Florida Forest Service Customer Number <https://www.fdacs.gov/Forest-Wildfire/Our-Forests/Florida-Forest-Service-Office-Locations/County-Foresters/Find-a-County-Forester>

This number is required: _____



Florida's Certified Pile Burner Training

Tuesday, April 11, 2023

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 Pencils 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.

Flatwoods Citrus newsletter by regular mail stopped last year.
You will receive your copy only through e-mail or through the following link:

<https://citrusagents.ifas.ufl.edu/newsletters/>

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

If you wish to be removed from our e-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
or E-mail: maz@ufl.edu

Subscriber's Name: _____

Company: _____

Phone: _____

E-mail: _____

Racial-Ethnic Background

American Indian or native Alaskan

White, non-Hispanic

Asian American

Black, non-Hispanic

Hispanic

Gender

Female

Male