UF UNIVERSITY of FLORIDA
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Institute of Food and Agricultural Sciences

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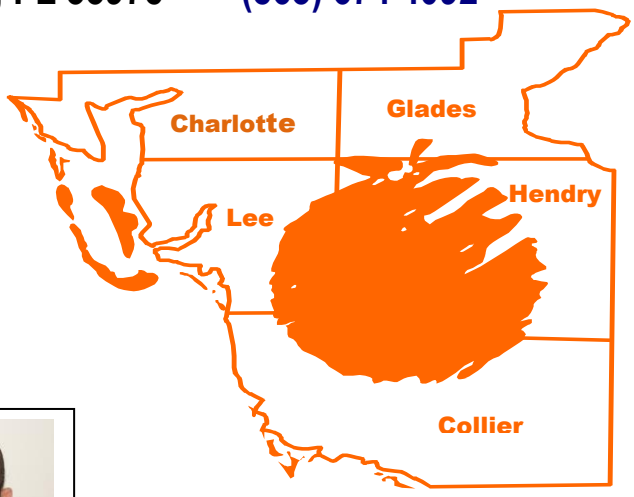
# Flatwoods Citrus




Vol. 24, No. 6 August 2021

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

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# September 2021 Zoom Citrus Seminar

Date & Time: Wednesday, September 1, 2021, 10:00 AM – 11:00 AM
Title: **Growing Citrus for the Fresh Market in Citrus Under Protective Screen (CUPS)**
Presentation summary:
· Update on six years of grapefruit yields in CUPS
· Current promising varieties for CUPS
· Final test results from experiments to determine the CUPS screen requirements for ACP exclusion
· Preliminary results from experiments to improve color break and internal fruit quality in CUPS using two approaches:
1) Photoselective shadecloth to manipulate the light spectrum on fruit during maturation.
2) Improving the temporal distribution of fertilization to better match supply and demand, thus avoiding nutrient deficiencies in spring and surpluses in the fall.
Presenter: **Dr. Arnold Schumann**, Professor at UF-IFAS, Citrus Research and Education Center, Lake Alfred.
Coordinator: Dr. Mongi Zekri, UF-IFAS

1 CEU for pesticide license renewal
1 CEU for certified crop advisors

Here is the Zoom link for the September citrus meeting
You are invited to a Zoom meeting.
When: September 1, 2021 10:00 AM Eastern Time (US and Canada)
Register in advance for this meeting:
https://ufl.zoom.us/meeting/register/tJYvf-6hqj0rGtAtSLyQ2b-75ESL2gTggw10

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



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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
12 August 2021

## ENSO Alert System Status: La Niña Watch

Synopsis: **ENSO-neutral is favored for the remainder of summer (~60% chance in the July-September season), with La Niña possibly emerging during the August-October season and lasting through the 2021-22 winter (~70% chance during November-January).**

Recently, sea surface temperatures (SSTs) were near-to-below average in the central and east-central equatorial Pacific, with above-average SSTs in the far eastern Pacific [Fig. 1]. In the last week, most Niño indices were slightly negative (-0.2°C to -0.3°C) except for the Niño-1+2 index, which was +0.7°C [Fig. 2]. Subsurface temperatures cooled considerably in July, becoming quite negative (averaged from 180-100°W; [Fig. 3]), reflecting the emergence of below-average subsurface temperatures east of the Date Line [Fig. 4]. Low-level wind anomalies were easterly over the east-central Pacific Ocean, while upper-level wind anomalies were westerly across the eastern Pacific. Tropical convection was suppressed over the western Pacific Ocean and enhanced over a small region near Indonesia [Fig. 5]. Given the surface conditions, the ocean-atmosphere system reflected ENSO-neutral.

Compared to last month, forecasts from the IRI/CPC plume are generally cooler in the Niño-3.4 SST region during the fall and winter 2021-22 [Fig. 6]. Recent model runs from the NCEP CFSv2 and the North American Multi-Model Ensemble suggest the onset of a weak La Niña in the coming months, persisting through winter 2021-22. The forecaster consensus continues to favor these models, which is also supported by the noticeable decrease in the observed subsurface temperature anomalies this past month. In summary, ENSO-neutral is favored for the remainder of summer (~60% chance in the July-September season), with La Niña possibly emerging during the August-October season and lasting through the 2021-22 winter (~70% chance during November-January; click CPC/IRI consensus forecast for the chances in 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). 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 September 2021.

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**
**College Park, MD 20740**

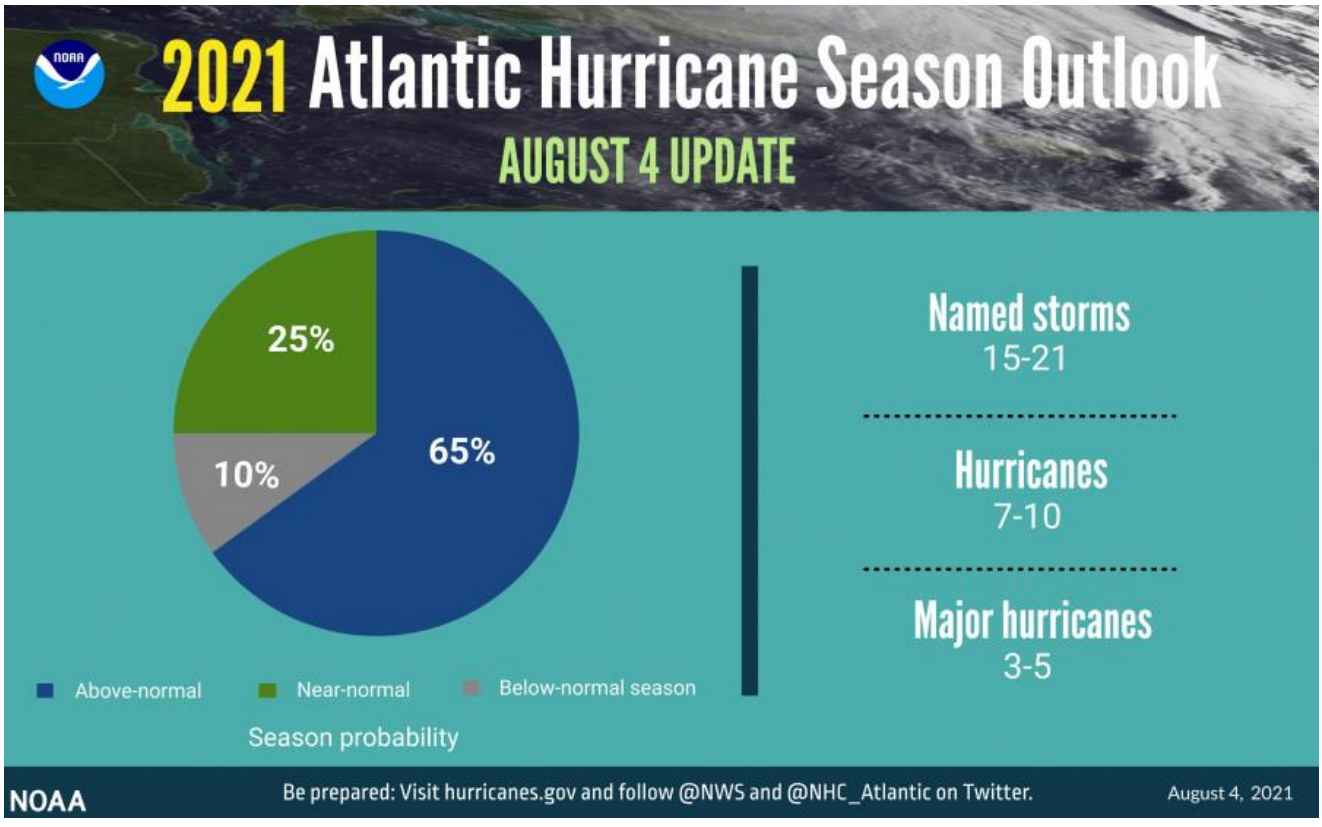
# NOAA increases number of named storms expected in the 2021 Atlantic hurricane season

**https://www.localsyr.com/weather/noaa-increases-number-of-named-storms-expected-in-the-2021-atlantic-hurricane-season/**

(WSYR-TV) — The 2021 Atlantic hurricane season officially began on June 1. Since then, we've had 5 named storms. Recently the Atlantic has been quiet but NOAA says the season shows no signs of slowing.

NOAA's Climate Prediction Center issued their annual mid-season update in early August, increasing the number of named storms they first predicted back in May.

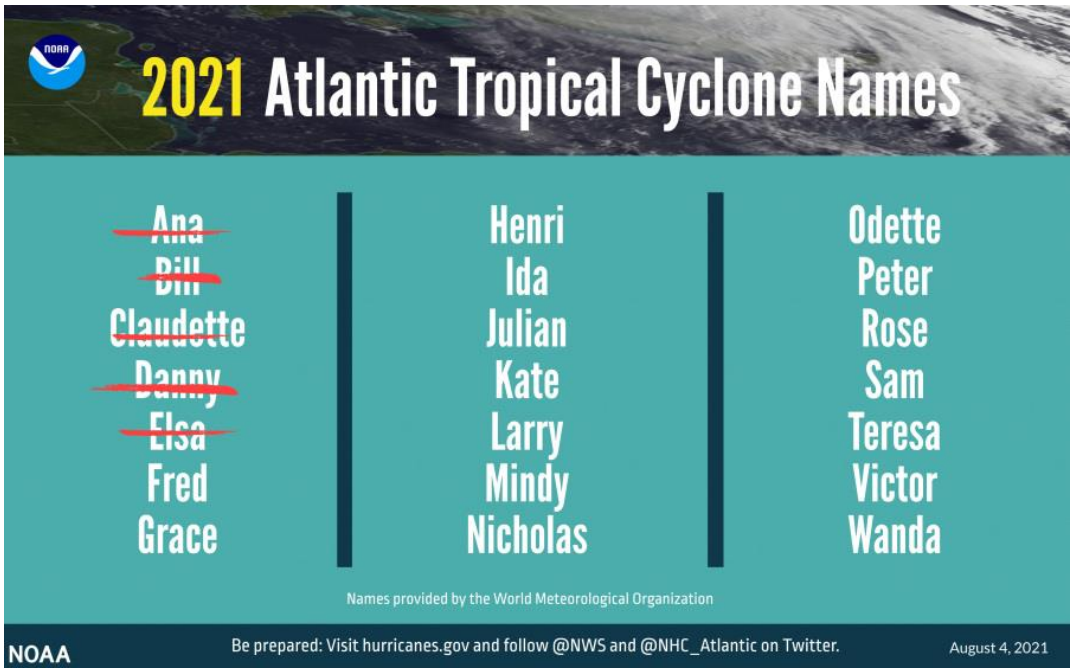
The original outlook had 13-20 named storms expected for the 2021 Atlantic hurricane season. The mid-season update states that the season is expected to have **15-21** named storms (winds of 39 mph or greater). Of the 15-21 named storms, they predict that **7-10** will be hurricanes (winds of 74 mph or greater), of which **3-5** could become major hurricanes (category 3, 4 or 5 with winds 111 mph or greater).



“After a record-setting start, the 2021 Atlantic hurricane season does not show any signs of relenting as it enters the peak months ahead,” said Rick Spinrad, Ph.D., NOAA administrator.

“A mix of competing oceanic and atmospheric conditions generally favor above-average activity for the remainder of the Atlantic hurricane season, including the potential return of La Nina in the months ahead,” said Matthew Rosencrans, lead seasonal hurricane forecaster at NOAA’s Climate Prediction Center.

The update covers the entire hurricane season, from June 1 to November 30.




# PHYTOPHTHORA

Foot rot results from infection of the scion near the ground level, producing bark lesions, which extend down to the budunion on resistant rootstocks.

Crown rot results from infection of the bark below the soil line when susceptible rootstocks are used. Root rot occurs when the cortex of fibrous roots is infected, turns soft and appears water-soaked.

Fibrous roots slough their cortex leaving only white thread-like stele.

When managing Phytophthora-induced diseases, consider integration of cultural practices (e.g., disease exclusion through use of Phytophthora-free planting stock, resistant rootstocks, proper irrigation practices) and chemical control methods.

Cultural practices. Field locations not previously planted with citrus are free of citrus-specific *P. nicotianae*. Planting stock should be tested free of Phytophthora in the nursery and inspected for fibrous root rot in the nursery or grove before planting. In groves with a previous history of foot rot, consider use of Swingle citrumelo for replanting. Swingle citrumelo is resistant to foot rot and roots do not support damaging populations once trees are established.

Cleopatra mandarin should be avoided because it is prone to develop foot rot when roots are infected in the nursery or when trees are planted in flatwoods situations with high or fluctuating water tables and fine-textured soils. Trees should be planted with the budunion well-above the soil line and provided with adequate soil drainage. Overwatering, especially of young trees, promotes buildup of populations in the soil and increases risk of foot rot infection. Prolonged wetting of the trunk, especially if tree wraps are used on young trees, should be avoided by using early to midday irrigation schedules. Control of fire ants prevents their nesting under wraps and causing damage to tender bark.

Sampling for *P. nicotianae*. Population densities of the fungus in grove soils should be determined to assist in decisions to treat with fungicides. Soil samples containing fibrous roots should be collected during the spring through fall (March to November) from under-canopy within the tree dripline. Individual small amounts of soil from 20 to 40 locations within a 10-acre area are composited into one resealable plastic bag to retain soil

moisture. Samples must be kept cool but not refrigerated for transport to the analytical laboratory. Currently, populations in excess of 10 to 15 propagules per $cm^3$ soil are considered damaging. The same soil sample could be tested for populations of nematodes, to assess whether they occur at damaging levels.

Chemical control.

Use of fungicides in young groves should be based on rootstock susceptibility, likelihood of Phytophthora infestation in the nursery, and history of Phytophthora disease problems in the grove. For susceptible rootstocks, such as Cleopatra mandarin and sweet orange, fungicides may be applied to young trees on a preventive basis for foot rot. For other rootstocks, fungicide treatments should commence when foot rot lesions develop. The fungicide program for foot rot should be continued for at least one year for tolerant rootstocks, but may continue beyond for susceptible stocks.

In mature groves, the decision to apply fungicides for root rot control is based on yearly soil sampling to indicate whether damaging populations of *P. nicotianae* occur in successive growing seasons. Time applications to coincide with periods of susceptible root flushes in late spring and late summer or early fall.

Soil application methods with fungicides should be targeted to under canopy areas of highest fibrous root density. To avoid leaching from the root zone, soil-applied fungicides should not be followed by excessive irrigation.

Recommended Chemical Controls for Phytophthora Foot Rot and Root Rot include Aliette, Phostrol, ProPhyt, Ridomil, UltraFlourish, and Copper.

For more details, go to:
https://crec.ifas.ufl.edu/media/crecifasufledu/production-guide/production-guide-20202021/Phytophthora.pdf

## HOW TO REDUCE DRIFT?

■ Avoid high spray pressure, which create finer droplets. Use as coarse a spray as possible and still obtain good coverage and control.
■ Don't apply pesticides under windy or gusty conditions; don't apply at wind speeds over 10 mph. Read the label for specific instructions.
■ Maintain adequate buffer zones to insure that drift does not occur off the target area.
■ Be careful with all pesticides. Insecticides and fungicides usually require smaller droplet sizes for good coverage and control than herbicides; however, herbicides have a greater potential for nontarget crop damage.
■ Choose an application method and a formulation that is less likely to cause drift.
■ Use drift reduction nozzles.
■ Use wide-angle nozzles, lower spray boom heights, and keep spray boom stable.
■ Use drift control/drift reduction agents. These materials are designed to minimize the formation of droplets smaller than 150 microns. They help produce a more consistent spray pattern and aid in deposition. Drift control additives do not eliminate drift. Therefore, common sense is still required.
■ Apply pesticides early in the morning or late in the evening; the air is often more still than during the rest of the day.
■ Don't spray during thermal inversions, when air closest to the ground is warmer than the air above it. When possible, avoid spraying at temperatures above 90° F.
■ Know your surroundings! You must determine the location of sensitive areas near the application site. Some crops are particularly sensitive to herbicides, which move off-site.
■ Be sure you are getting the spray deposition pattern you think you are; service and calibrate your equipment regularly.
■ Whenever possible, cut off the spray for missing trees in the row. Spray that does not enter the tree canopy is wasted and contributes significantly to drift problems.
■ Keep good records and evaluate pesticide spray results.

**Remember,**
**ALWAYS read and follow label directions.**

# LEAF AND SOIL SAMPLING AND ANALYSES TO ADJUST FERTILIZER PROGRAMS

Optimum growth and yield of high quality fruit cannot be obtained without adequate nutrition. The most successful fertilizer program should be based on tissue analysis, knowledge of soil nutrient status through soil analysis combined with university recommendations. The deficiency or excess of an element will cause disturbance in plant metabolism and lead to poor performance.

**Plant analysis**

Used in conjunction with other data and observations, tissue analysis aids in evaluating the nutrient elements of the soil-plant system. It has proven useful in confirming nutritional deficiencies, toxicities or imbalances, identifying "hidden" toxicities and deficiencies where visible symptoms are not manifested, and evaluating the effectiveness of fertilizer programs.

**Leaf Sampling**

For reliable results and useful interpretation of lab analysis reports, citrus growers, production managers, and consultants must follow the proper procedures for leaf sampling and sample handling because improperly collected leaf samples will provide misleading information about the nutritional status of the trees and the fertilizer programs.

Considerable care is needed in taking samples. Chemical analysis values can only be useful if the samples obtained are representative of the blocks they were taken from. The proper sampling, preparation and handling would affect the reliability of the chemical analysis, data interpretation, nutritional recommendations, and adjustment of fertilizer programs.

Leaf samples must also be taken at the proper time because nutrient levels within leaves are continually changing. However, leaf mineral concentrations of most nutrients are relatively stable within 4 to 6 months after emergence of the spring flush. Therefore, for mature tree blocks, the best time would be in **July and August** to collect four- to six-month-old spring flush leaves. If taken later in the season, the summer flush would probably be confused with the spring flush.

Each leaf sample should consist of about 100 leaves taken from non-fruiting twigs of 15- 20 uniform trees of the same variety and rootstock, and under the same fertilizer program. Clean brown paper bag should be used. Information sheets from the testing lab should be completed for each sample as this information helps when interpreting the results. The sample bag and the corresponding information sheet should each be carefully labeled with the same identity so that samples and sheets can be matched in the laboratory.

**Sampling techniques for leaves**

♦ Immature leaves should be avoided because of their rapidly changing composition.

♦ Abnormal-appearing trees, trees at the edge of the block and trees at the end of rows should not be sampled because they may be coated with soil particles and dust or have other problems.

♦ Do not include diseased, insect damaged, or dead leaves in a sample. Use good judgment.

♦ Select only one leaf from a shoot and remove it with its petiole (leaf stem).

**Diagnosing growth disorders**

♦ Collect samples from both affected trees as well as normal trees.

♦ Trees selected for sampling should be at similar stage of development and age.

♦ Whenever possible, confine the sampling area to trees in close proximity to each other.

**Handling of leaf samples**

♦ Samples should be collected in clean paper bags and clearly identified.

♦ They should be protected from heat and kept dry and cool (stored in portable ice chests), and placed in a refrigerator for overnight storage if they cannot be washed and oven dried the same day of collection.

♦ For macronutrient analysis, leaves usually do not need to be washed.

♦ Leaves should be dried in a ventilated oven at 60-70$^{o}$C.

**Preparation for analysis**

♦ Leaves that have been recently sprayed with micronutrients for fungicidal (Cu) or nutritional (Mn, Zn) purposes should not be analyzed for those micronutrients because it is unlikely to remove all surface contamination from sprayed leaves.

♦ For accurate Fe and B or other micronutrient determination, samples would require hand washing, which is best done when leaves are still in a fresh condition.

**Soil analysis**

Soil analysis is an important method for gaining basic information regarding the chemical status of the soil. Soil analysis is particularly useful when conducted over several years so that trends can be seen.

Unlike leaf analysis, there are various methods and analytical procedures of soil analysis used by laboratories. In Florida, soil tests for the relatively mobile and readily leached elements such as N and K are of no value. Soil tests are mainly important for pH, P, Mg, Ca, and Cu. For Florida sandy soils, using the Mehlich-1 or double acid (hydrochloric acid + sulfuric acid) extraction procedure adopted by the University of Florida analytical lab, 40-60 lbs/acre (20-30 ppm) of P, 70-120 lbs/acre (35-60 ppm) of Mg, 500-800 lbs/acre (250-400 ppm) of Ca, and 5-10 lbs/acre (2.5-5 ppm) of Cu are considered adequate for citrus. A Ca:Mg ratio of 7:1 seems desirable and ratios of higher than 10 may induce Mg deficiency problems. Copper levels higher than 50 lbs/acre may be toxic to citrus trees if the soil pH is below 6.

**Soil sampling**

The accuracy of a fertilizer recommendation depends or how well the soil sample on which the recommendation was based represents the area of the grove. In Florida, if soil samples were to be collected once a year, the best time would be at the end of the summer rainy season and prior to fall fertilization, usually during September and October. However, soil sampling may be conducted at the same time as leaf sampling to save time and reduce cost.

Standard procedures for proper sampling, preparation and analysis have to be followed for meaningful interpretations of the test results and accurate recommendations. Each soil sample should consist of 15-20 soil cores taken at the dripline of 15-20 trees within the area wetted by the irrigation system to a depth of 6 inches. The area sampled should be uniform in terms of soil and tree characteristics and correspond to the area from which the leaf sample was taken. Individual cores should be mixed thoroughly in a plastic bucket to form a composite sample. Subsample of appropriate size should be taken from the composite mixture and put into labeled paper bags supplied by the lab.
Soil samples should be air-dried but not oven-dried before shipping to the testing laboratory for analysis.

**Conclusion**

Tissue and soil analyses are a powerful tool for confirming nutrient deficiencies, toxicities and imbalances, identifying "hidden hunger," evaluating fertilizer programs, studying nutrient interactions. However, if initial plant and soil sampling, handling, and analysis of the sample were faulty, the results would be misleading.

If properly done, tissue and soil analyses can point the way toward more economical and efficient use of fertilizer materials, avoiding excessive or inadequate application rates.

**For more details, consult UF-IFAS publication SL 253, "Nutrition of Florida Citrus Trees," at** http://edis.ifas.ufl.edu/pdffiles/SS/SS47800.pdf

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# Standard Table for Assessing Nutritional Status and Adjusting Fertilizer Programs for Citrus

**Leaf analysis standard for assessing current nutrient status of citrus trees based on concentration of mineral elements in 4- to 6-month-old-spring-cycle leaves from non-fruiting terminals.**

| Element | Deficient less than | Low | Satisfactory | High | Excess more than |
|---|---|---|---|---|---|
| Nitrogen (N) (%) | 2.2 | 2.2-2.4 | **2.5-2.8** | 2.9-3.2 | 3.3 |
| Phosphorus (P) (%) | 0.09 | 0.09-0.11 | **0.12-0.17** | 0.18-0.29 | 0.30 |
| Potassium (K) (%) | 0.7 | 0.7-1.1 | **1.2-1.7** | 1.8-2.3 | 2.4 |
| Calcium (Ca) (%) | 1.5 | 1.5-2.9 | **3.0-5.0** | 5.1-6.9 | 7.0 |
| Magnesium (Mg) (%) | 0.20 | 0.20-0.29 | **0.30-0.50** | 0.51-0.70 | 0.80 |
| Sulfur (S) (%) | 0.14 | 0.14-0.19 | **0.20-0.40** | 0.41-0.60 | 0.60 |
| Chlorine (Cl) (%) | ------ | ------ | **less than 0.5** | 0.5-0.7 | 0.7 |
| Sodium (Na) (%) | ------ | ------ | **less than 0.2** | 0.2-0.5 | 0.5 |
| Iron (Fe) (ppm) | 35 | 35-59 | **60-120** | 121-200 | 250 |
| Boron (B) (ppm) | 20 | 20-35 | **36-100** | 101-200 | 250 |
| Manganese (Mn) (ppm) | 18 | 18-24 | **25-100** | 101-300 | 500 |
| Zinc (Zn) (ppm) | 18 | 18-24 | **25-100** | 101-300 | 300 |
| Copper (Cu) (ppm) | 4 | 4-5 | **6-16** | 17-20 | 20 |
| Molybdenum (Mo) (ppm) | 0.06 | 0.06-0.09 | **0.1-1.0** | 2-50 | 50 |

# ALGAE

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## 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 alga 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.

# BROWN ROT ON EARLY MATURING FRUIT

Management of brown rot, caused by *Phytophthora nicotianae* or *P. palmivora*, is needed on both processing and fresh market fruit. While the disease can affect all citrus types, it is usually most severe on Hamlin and other early maturing sweet orange cultivars.

Phytophthora brown rot is a localized problem usually associated with restricted air and/or water drainage. It commonly appears from mid-August through October following periods of extended high rainfall. It can be confused with fruit drop due to other causes at that time of the year. If caused by *P. nicotianae*, brown rot is limited to the lower third of the canopy because the fungus is splashed onto fruit from the soil. *P. palmivora* produces airborne sporangia and can affect fruit throughout the canopy.

Early season inoculum production and spread of *Phytophthora* spp. are minimized with key modifications in cultural practices. Skirting of the trees reduces the opportunity for soil-borne inoculum to contact fruit in the canopy. The edge of the herbicide strip should be maintained just inside of the dripline of the tree to minimize the exposure of bare soil to direct impact by rain. This will limit rain splash of soil onto the lower canopy. Boom application of herbicides and other operations dislodge low-hanging fruit. Fruit on the ground becomes infected and produces inoculum of *P. palmivora* that can result in brown rot infection in the canopy as early as July while fruit are still green. The beginning stages of the epidemic are very difficult to detect before the fruit are colored and showing typical symptoms. Application of residual herbicides earlier in the summer may reduce the need for post-emergence materials later and minimize fruit drop throughout this early stage of inoculum production from fallen fruit.

Usually a single application of Aliette, Phostrol or ProPhyt before the first signs of brown rot appear in late July is sufficient to protect fruit through most of the normal infection period. No more than 20 lb/acre/year of Aliette should be applied for the control of all Phytophthora diseases. Aliette, Phostrol and ProPhyt are systemic fungicides that protect against postharvest infection and provide 60-90 days control. Copper fungicides are primarily protective but are capable of killing sporangia on the fruit surface and thus reducing inoculum. They may be applied in August before or after brown rot appearance and provide protection for 45-60 days. If the rainy season is prolonged into the fall, a follow-up application of either systemic fungicides at one-half of the label rate, or copper in October may be warranted. With average quality copper products, usually 2-4 lb of metallic copper per acre are needed for control.

Precautions should be taken during harvesting not to include brown rot-affected fruit in the field containers as this could result in rejection at the processing or packing facility.

## Recommended Chemical Controls for Brown Rot of Fruit

| Pesticide | FRAC MOA[2] | Mature Trees Rate/Acre[1] |
|---|---|---|
| Aliette WDG | P07 | 5 lb |
| Phostrol | P07 | 4.5 pints |
| ProPhyt | P07 | 4 pints |
| copper fungicide | M01 | Use label rate. |

[1]Lower rates may be used on smaller trees. Do not use less than minimum label rate.
[2]Mode of action class for citrus pesticides from the Fungicide Resistance Action Committee (FRAC) 2018. Refer to ENY624, Pesticide Resistance and Resistance Management, in the 2018-2019 Florida Citrus Production Guide for more details.

**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.**

**For more information, go to Florida Citrus Production Guide: Brown Rot of Fruit at:** ***https://crec.ifas.ufl.edu/media/crecifasufledu/production-guide/production-guide-20202021/Brown-Rot.pdf***

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Please send: Dr. Mongi Zekri
Multi-County Citrus Agent
Hendry County Extension Office
P.O. Box 68
LaBelle, FL 33975
E-mail: maz@ufl.edu

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## ***Racial-Ethnic Background***

__American Indian or native Alaskan
__Asian American
__Hispanic
__White, non-Hispanic
__Black, non-Hispanic

## ***Gender***

__Female
__Male