2023–2024 Florida Citrus Production Guide: Useful Websites and Mobile Apps[1]

Jamie D. Burrow, Chris Oswalt, Mongi Zekri, Ajia M. Paolillo, and Matthew Smith[2]

Over the last decade, technology has changed rapidly, and today carrying a mobile device puts a computer in your hands. With the ever-evolving changes in technology, the agriculture industry is implementing tools to help growers make better management decisions for their crops. GPS equipment in tractors, computer programs to predict disease progression, and mobile phone apps to monitor weather are a few of the most common advances in technology being used.

Several web-based programs and mobile apps are available for free or at a cost. These programs can be used to assist in the decision-making process of maintaining Florida citrus groves. A variety of programs are available through UF/IFAS, along with others from government and private entities. The listing here does not indicate general or specific endorsement or exclusion of a product or service, nor does it indicate approval by UF/IFAS Extension.

Websites

Citrus Copper Application Scheduler

http://agroclimate.org/tools/citrus-copper-application-scheduler/

The Citrus Copper Application Scheduler is designed to assist in determining the best time to make copper applications for citrus canker (see chapter 30 of this guide, PP-182,

Citrus Canker, https://edis.ifas.ufl.edu/cg040). By submitting rainfall data (your own records or selecting the nearest weather station), bloom date, and last copper application, a graph will be produced to show you the copper residue still on the fruit. Based on the graph, it will provide an estimate of the next best time to apply copper. The program uses several years of collected data to estimate fruit size based on rainfall and bloom date; therefore, the graph shows the amount of copper still on the fruit based on the fruit growth.

Florida Automated Weather Network (FAWN)

https://fawn.ifas.ufl.edu/

FAWN provides weather data for the entire state from weather stations maintained by UF/IFAS and local farm weather stations. For each weather station, the website provides current and historical readings of temperature, wind, rainfall, soil temperature at 10 cm, sunlight (in Rads), heat index, and dew point that you can view in table or graphical format. In addition, there are tools to assist the grower, including a cold-protection toolkit, forecast tracker, chill-hour accumulation, evapotranspiration, and irrigation scheduling. The FAWN Freeze Alert system is a new feature with a mobile phone alert of when to start and stop cold-protection irrigation. The Citrus Pesticide Application tool

provides information for your site on the weather conditions for pesticide application to help you schedule a time for safe application. Click on the weather station closest to your site from the map on the home page, and access the tools on the left side of the page or from the tabs at the top of the page.

Weather Underground

https://www.wunderground.com/

Weather Underground, founded in 1995, supplies weather data to many of the leading media companies and millions of users across the globe. They have over 270,000 weather stations worldwide and provide weather data in real time. This website provides information ranging from current conditions to an interactive map including weather stations, radar, satellite, heat map, and rain accumulation. The website and app provide severe weather alerts, weather radio, and full customization of options on your desktop.

Windy

www.windy.com

Windy allows users to access data directly from major weather forecast models in an easy-to-use format. The number of available layers is extensive. Along with current conditions, Windy provides forecast weather data including wind and wind accumulation, cloud cover, rain and rain accumulation, temperature (including dew point and wet bulb), air quality (including dust mass), soil moisture and soil moisture anomaly. Because Windy presents raw model data, there is a slight learning curve; and it is helpful to compare multiple models along with advice from your local weather station as you learn the strengths and weaknesses of each model. Do not use Windy to make hurricane decisions; the National Hurricane Center forecast is statistically the most accurate.

Citrus Microsprinkler Irrigation Scheduler

https://fawn.ifas.ufl.edu/tools/irrigation/citrus/scheduler/

The microsprinkler irrigation scheduler is part of the irrigation toolkit provided by FAWN. Users enter the tree spacing, details about emitters, soil type, irrigation depth, irrigation trigger depth, and the local FAWN station. The tool will then calculate a two-week irrigation schedule to maximize irrigation efficiency. Having a Mobile Irrigation Lab provide details on irrigation system efficiency will establish some of the information needed for calculations.

Flower Bud Induction Advisory and Decision Information System for Citrus

https://crec.ifas.ufl.edu/research/citrus-production/flower-bud-induction/

http://disc.ifas.ufl.edu/bloom/

Citrus flower bud growth and development is determined by winter temperatures that may fluctuate. Predicting the bloom date is key to managing production. The Flower Bud Induction Advisory takes the temperatures, updated every two weeks, and calculates the intensity and time of bloom as part of the Decision Information System for Citrus. Early warm periods after cool may stimulate a weak bloom, and later cool/warm conditions may stimulate additional blooms. The Citrus Flowering Monitor uses observed and predicted weather patterns and other cultural metrics (such as cultivar, tree age, and soil type) to predict bloom. Users enter parameters specific to their grove to get a prediction. The Citrus Flowering Monitor also gives specific recommendations on how to manage bloom.

Citrus Advisory System

http://agroclimate.org/tools/cas/

Colletotrichum acutatum is a fungus that infects flowers on all species of citrus and causes postbloom fruit drop (PFD). Severity on a given cultivar varies according to the time of bloom in relation to rainfall because spores produced on the blooms, leaves, buttons, and twigs splash onto other flowers to spread the disease. Preventive fungicides must be applied during bloom, but the number of fungicides available and the number of applications for each fungicide are limited, so timing of sprays is critical, especially with prolonged bloom periods. The Citrus Advisory System uses real-time weather data from FAWN to determine if risk conditions for PFD are low, moderate, or high and gives specific fungicide spray recommendations according to the disease risk conditions. The user may set up an email alert to be sent when an infection event has occurred to alert the user to check the model for the risk at their site.

Ask IFAS/Electronic Data Information Source (EDIS)

https://edis.ifas.ufl.edu/

The University of Florida Institute of Food and Agricultural Sciences (UF/IFAS) has an extensive collection of informative documents available to print or view online. All documents are free to view and print. As of 2021, the public

site is newly rebranded Ask IFAS but can still be referred to as the Electronic Data Information Source, or EDIS for short. The documents available cover a wide range of topics, including commercial agriculture, urban horticulture, consumer sciences, and youth programs, and many of them are written for a general audience.

For EDIS inquiries, you can contact any UF/IFAS Extension office for assistance, or see the EDIS FAQ page for contact information for the EDIS production and editing staff: https://ics.ifas.ufl.edu/our-services/publication-editing-edis/.

UF/IFAS Extension Citrus Agents

http://citrusagents.ifas.ufl.edu

This site is designed to disseminate knowledge and information to growers and the citrus community in the state of Florida. The information is intended to enhance the productivity, profitability, and environmental stewardship of Florida citrus growers through practice implementation, adoption, and education using applied citrus research.

Once at the site, you will find access to current newsletters from each of the county agents that specialize in citrus, as well as helpful links including upcoming events, continuing education unit (CEU) article series, citrus publications, Worker Protection Standards (WPS) resources, postbloom fruit drop presentations, and archived presentations. Additionally, a photo series is available that has monthly photos of the same trees from October 2010 to September 2019 to show the progression of citrus greening over time.

USDA Citrus Statistics

https://www.nass.usda.gov/Statistics_by_State/Florida/Publications/Citrus/

This website provides citrus production forecast monthly reports, forecasting methodology and development, citrus statistics, citrus abandoned acres, maturity yield and test results, citrus summaries, commercial citrus inventories, and historical reports dating back over 50 years.

Citrus Variety Collection, University of California Riverside

https://citrusvariety.ucr.edu/varieties.html

This website provides descriptions, characteristics, photos, sources, parentage/origins, rootstocks of accession, and season of maturity of selected citrus varieties by alphabetical order, category, or type. It also provides fruit quality

evaluation data and related articles, references, and other information for the selected citrus varieties.

Key to Diaprepes IPM in Florida Groves

https://crec.ifas.ufl.edu/extension/diaprepes/

This website has three main sections: (1) Meeting Reports related to the Diaprepes Task Force for 2004–06; (2) Bibliography from 1970 to the present; and (3) Management Key for both pre- and postplant decisions. The website highlights the extensive work that has been conducted to study the Diaprepes root weevil, the damage it causes, and various control options that have been recommended.

Citrus ID

http://idtools.org/id/citrus/citrusid/

The Citrus ID website was created in 2011 and led by the USDA and North Carolina State University. Various people from the industry, Extension, and government affiliations contributed to the content of the website. The website contains information on citrus pests and diseases with written information and photos. It contains fact sheets, a glossary, a photo gallery, and more.

Mobile Apps

Radar Now!

This app puts a weather radar in your pocket. Users can quickly see an animated radar image and current conditions. Radar Now! provides National Weather Service (NWS) Enhanced Radar images from NOAA Radar sites located around the United States. This app is free with an optional paid upgrade to remove ads.

WUnderground

This app is the free companion for cell phones from Weather Underground. This app will provide current conditions at local weather stations, or you can drop a pin in your neighborhood for conditions there. You can follow things such as "feels like" temperatures, wind speed/direction, rain accumulation, and forecasts ranging from hourly to 10-day.

Weather Hi-Def Live Radar

This simple yet powerful app lets you view real-time animated weather radar images in color on an interactive map. With this app you can view radar, clouds, wind speed, temperatures, water temperatures, and more. A great feature of this app is a Severe Weather Overlay that can be

placed over the map and watched as the weather moves toward the user's location.

Google Earth

The Google Earth app allows users to access directions and digital satellite maps. It includes a map ruler to determine length or distance and acreage, and it is free of cost.

SoilWeb

The SoilWeb app was created by the California Soil Resource Lab (CSRL) at the University of California, Davis. They partnered with the USDA–Natural Resources Conservation Service to use information from the SSURGO (Soil Survey Geographic Database) dataset to generate specific soil details. SoilWeb uses GPS to access the user's current location and gives the characteristics and composition of the soil in that area. The app provides the soil name(s) along with a simulation image of the soil profile, which includes horizons and corresponding depths in the soil. The user can select an individual soil type to access a large amount of detailed information that can be very beneficial in the field. The app lists soil taxonomy, characteristics of soil horizons, geographic settings the soil is typically found in, water-holding capacity, and much more. The "Details" tab for each soil lists "Soil Suitability Ratings," which gives a description for uses in areas such as Agriculture, Forestry, Urban/Recreational, and Wildlife. The Agriculture rating lists the leaching and surface runoff potential of the soils to aid in decisions about pesticide applications. The app also offers a feature to allow for more or less location accuracy based on the amount of battery power it uses. Web links are provided for CSRL applications, the USDA–NRCS homepage, and the SSURGO database. SoilWeb is available in both the App Store and Google Play.

Citrus Diseases Key

The Citrus Diseases Key application is designed to help you diagnose diseases based on the symptoms you see. The app is an interactive Lucid Key, updated in 2018 and available on the App Store, Google Play, and http://idtools.org/id/citrus/diseases. It covers citrus diseases in the United States and of concern elsewhere. When you open the app, you choose where the symptoms are seen: on the entire tree, the leaf, or the fruit. The key will lead you through selections where you choose yes or no based on observations. You may enter as many symptoms as you see. When you have made all your selections, press "Remaining" at the bottom, and the diagnosis is presented with information about the disease, its symptoms, distribution, host range, disease cycle, whether there is any regulatory information,

similar diseases that it may be confused with, and further identifying photos. If you wish to review which selections you made, press "Selections." If you wish to look over the options again and select or deselect some, press "Features." If your described symptoms match more than one disease, the ones that match are presented with further details to help you decide which it could be.

Citrus Diagnosis

This is a web-based smartphone app that uses artificial intelligence to diagnosis nutrient deficiencies, pests, and diseases in citrus. The program uses an artificial neural network and deep learning specifically trained to diagnose these citrus problems. Sign-up and activation for the app can be accessed from http://www.makecitrusgreatagain.com by selecting the smartphone app icon on the home page.