Traditionally, scale insects in Florida have been under control by natural enemies and considered a minor pest. However, recently many growers in the panhandle are experiencing high populations of scales, specifically of the Florida red scale \((Chrysomphalus aonidum)\) and of the false Florida red scale \((Chrysomphalus bifasciculatus)\) during the growing season. Since the majority of citrus grown in this region is marketed for the fresh market, scale is of particular concern as its presence on the fruit reduces the marketability of the fruit and results in losses for the grower. It is important to monitor for scales early in the growing season to aid in making effective management decisions.
In the past, Florida red scale used to be very well controlled by natural enemies, including ladybeetle predators and other parasitoids. Some factors that could have attributed to the increase in scale populations are: 1) weather conditions, 2) movement of pests into groves where natural enemies do not occur, and/or 3) repeated applications of broad-spectrum insecticides during periods when natural enemies are active. Because of this, the first action, might be to just eliminate any unnecessary insecticide applications. Since many insecticide programs are targeted at managing citrus leafminer, these should be evaluated and in mature groves, reduced as mature trees sustain little leafminer damage.

Despite its name, the Florida red scale is native to Asia and is currently widespread in all tropical and subtropical region of the world. This species is an armored scale, characterized by sessile (either very slow moving or not mobile at all) females and nymphs. It has a hard and waxy circular armor that is dark reddish brown with a light brown center. Adult females are about 2.0-2.2 mm in diameter and deposit bright yellow eggs under the scale armor.

Control of armored scale is particularly difficult as they spend most of their life protected by the scale cover. It is only the earliest nymph instar that is mobile and unprotected. Since this stage is mobile, the moving nymphs are referred to as ‘crawlers’. This stage is the most susceptible to insecticides. Therefore, it is important to monitor for crawlers in the early spring to target insecticide applications to this life cycle stage.
When scales are in the crawler stage, most insecticide labeled for scales will be effective in controlling the population, however, buprofesin (IRAC MOA 16) and spirotetramat (IRAC MOA 23) are the best options. It is important to note that thorough coverage is important, as scales are largely immobile and direct contact of the insecticide is essential.

Scout for Scales Early This Spring (Continued)

Insecticide applications targeted for scales are only recommended if the population is at a high density and causing significant damage to trees or fruit. Currently, there are no economic injury levels or thresholds for scale insects in Florida. Therefore, the grower must evaluate the situation, the intensity of the population and how much damage is likely to occur.

When monitoring for scales, it is important to base management decisions on the population levels of living scales. It is not uncommon to mistake scale bodies from previous generations and/or parasitized scales for living scales, resulting in an insecticide application that may have not been necessary or ineffective. To monitor for scale crawlers, use double-side sticky tape wrapped around a citrus branch or near scale adults and check weekly.

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In the adult stage, Florida red scale will be more difficult to control. When in this stage, the best option for control is horticultural mineral oil at 2%. When using horticultural oil, do not apply if the temperature is above 94°F, as this will cause phytotoxic damage. Be sure to always READ THE LABEL. For the full list of insecticides labeled for scales, refer to the Florida Citrus Production Guide.
Maintaining nutritional health of a citrus tree goes a long way in the prevention of disease and the sustainability of the best health it can have. To achieve good fruit quality, and highest yields, coordinating fertilizer applications to meet the needs is essential. Timing, amounts, rates, and methods of fertilizer applications are site specific and valuable components for a good nutrient management program. A strategy for good nutrient management includes the rainfall variability in our area in conjunction with fertilizing methods.

**First consideration is to have a soil test.** A soil test will give you accurate information of what nutrients are present or lacking as well as the pH and salt levels. Test results provide guidelines and recommendations of what nutrients you need or not to apply. Keep all records of lab results to see trends of changes that will help in tweaking applications if needed. Without question, knowing the amounts of specific nutrients lacking or abundant on your crop will save money, time, and reduce unnecessary chemical runoff to our surface and ground waters. The first three years, scouting with a good eye on the on upper and lower sides of leaf’s will be your best bet for tell-tale signs of visible pests.

**Second consideration:** test your irrigation source annually. Issues in the waters chemistry can be the root of problems such as systems plugging up from high calcium levels, salt intrusions, levels of pollutants etc. which could provide you with guidelines for future adjustments and is a requirement by the Food and Safety Audit program.

**Third consideration** is to enroll in the Best Management Practices Program, (BMP) through the Florida Department of Agriculture and Consumer Services (FDACS). Agricultural BMP’s are practical measures that producers can take to reduce the amount of fertilizers, pesticides, animal waste and other pollutants that enter Florida’s water resources. They were designed to improve water quality and conserve water while maintaining and even increasing agricultural production.
Varying factors can result in nutrient loss that may lead to taking several seasons for a tree to recover vigor, resulting in lower yields, increase stress, which contributes to weakness, and susceptible to pest and disease. When you are determining when to fertilize whether it be granularly, foliar, or through the irrigation system, include the external factors such as excessive rainfall months; June through September and high winds (when Mother Nature contributes to fruit and leaf drop) will affect soil nutrient levels. Leaching from rainfall and improper timing of applications, can result in loss of nutrients going straight down pass through the root zone. Visual signs of the trees and fruit response will show you nutrient deficiencies. When you “think” the fertigation is sufficient, this might be the time that you go back to the first consideration, to have a second soil and tissue test to KNOW for sure.

According to the soil test, you can minimize fertilizer loss by increasing or decreasing applications that are applied through irrigation systems referred to as Fertigation, (fertilizer mixed with irrigation systems). Other chemicals like herbicides, fungicides and bio stimulants can also be applied through the irrigation system which is referred to as Chemigation. An application of Controlled Release Fertilizer (CRF), which are typically granular, are time released formulations that provide nutrient availability over 3, 6, or 9-month time periods. CRF’s have been found to be more efficient in saving energy, reduce environmental pollution, while providing a continuous supply of nutrients for tree and fruit development. Incorporating Foliar (leaves) applications are highly concentrated sprays that is absorbed quickly through leaf surfaces. Foliar applications are helpful when, root systems are inhibited, or during vegetative growth, fruit setting and fruit growth. They are mostly effective during critical short periods of nutrition needs or correcting a minor element deficiency. Timing of fertilizer application can be found in Nutrition of Florida Citrus Trees, EDIS publication #SL253.

Fourth consideration (optional), for nutrient and moisture management include utilizing tools that can provide you with precise data in addition to soil and tissue testing. Tools such as soil moisture probes, tensiometers, Florida Automated Weather Network (FAWN) real time data that allows users to view data from weather stations that are directly located on the grove, drones, wet bulbs, soil moisture cut off sensors, tree mapping and GPS data programs.
Stay current by networking with other growers, subscribe to Citrus Grower, VSCNews.com, CitrusIndustry.net, SoutheastAgNet.com, CitrusExpo.net, AgNetWest.com publications or any science base researched articles. Attend seminars, field days, expos, visit UF’s research stations, keep contact with your local and surrounding County Extension Agents, and refer to the UF/IFAS Electronic Data Information System (EDIS) website; http://edis.ifas.ufl.edu for current publications on citrus related issues. Refer to FAWN’s website: https://fawn.ifas.ufl.edu/

NOTE: In addition to soil test, tissue test provides more detailed nutrient concentrations once trees are old enough. **Trees three years and younger are not recommended for tissue testing.** Tissue test require removal of about 100 mature leaves from 15-20 trees so a young tree cannot afford to lose any leaves at that stage. For a more mature grove, a combination of both soil and tissue test improves your predictability to improve the nutrient management program when applicable.

Since fruit yield and fruit quality are directly related to nutrients taken up by the tree it is only logical to use all methods; granular, fertigation and foliar fertilizer application methods as recommended in concert with each other. This article is a supporting document for:

- Florida Citrus Production Guide: Fertilizer Application Methods
- Florida Citrus Production Guide: Nutrition Management for Citrus Trees
In 2020 there was an extended bloom over several weeks instead of a major bloom in mid-March. There was a lot of foliar growth as well. Fruit ripened earlier in 2020. Brix was taken in Nov. 10 in 2020 and Nov. 25 in 2019. Fruit was ripe internally in 2020 before the fruit had completely turned orange. This was more evident in the heavy yielding rootstocks. There was a much higher percentage of cull fruit in 2020 (43%) compared to 2019 (19%). I considered culls fruit over 3” in diameter or larger which is about a 200g fruit. Extra puffy and sunburned fruit was also considered cull fruit.

Overall fruit weight of marketable fruit was higher in 2020 (172g) than 2019 (142g). The overall fruit size in general lead to more cull fruit.

Yields of Sour Orange, Kuharski, Cleopatra, and X-639 decreased in 2020. In 2019, X-639 & Kuharski had the highest overall fruit yield.


The Brix level is relatively similar between years and between rootstocks. To obtain Brix data 10 fruit are picked from each tree, juiced, centrifuged, and tested. A total of 60 juiced fruit represents each rootstock.

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**Owari Rootstock Trial Comparison of Select Data from 2019 and 2020**

<table>
<thead>
<tr>
<th>Rootstock/Year Planted</th>
<th>2019 Brix</th>
<th>2020 Brix</th>
<th>2019 Average Fruit Weight (Grams)</th>
<th>2020 Average Fruit Weight (Grams)</th>
<th>2019 Total Yield</th>
<th>2020 Total Yield</th>
<th>2019 Canopy Volume ft³</th>
<th>2020 Canopy Volume ft³</th>
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</thead>
<tbody>
<tr>
<td>Sour Orange/15</td>
<td>10.3</td>
<td>10.1</td>
<td>146</td>
<td>194</td>
<td>66</td>
<td>40</td>
<td>162</td>
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<td>Kuharski/14</td>
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<td>10.5</td>
<td>138</td>
<td>195</td>
<td>181</td>
<td>146</td>
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<td>9.7</td>
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<td>139</td>
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<td>US-852/15</td>
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<td>10.5</td>
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<td>10.3</td>
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<td>177</td>
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<tr>
<td>X-639/14</td>
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<td>10.2</td>
<td>129</td>
<td>180</td>
<td>187</td>
<td>157</td>
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<tr>
<td>Swingle/14</td>
<td>10.2</td>
<td>10.4</td>
<td>145</td>
<td>168</td>
<td>97</td>
<td>158</td>
<td>237</td>
<td>272</td>
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UF/IFAS Virtual Grower Trainings:

Citrus Seminar: 10AM EST, January 20, 2021
Speaker: Dr. Ozgur Batuman; Topic: Citrus disease trends we should heed: Phytophthora, HLB and Leprosis
Click Here to Register

OJ Break Grower Meeting: 1 PM EST, January 26, 2021
Speaker: Dr. Arnold Schumann; Topic: diagnosing citrus leaf symptoms with artificial intelligence apps
Click Here to Register

OJ Break Grower Meeting: 1PM EST, February 9, 2021
Speaker: Dr. Tripti Vashisth; Topic: Nutrition box program update and data used for recommendations
Click Here to Register

OJ Break Grower Meeting: 1PM EST, February 23, 2021
Speaker: Dr. Evan Johnson; Topic: Recent increase in trunk disorders and HLB root health update
Click Here to Register

Remote Produce Safety Alliance Grower Training

A virtual course for fruit and vegetable growers and packers who fall under the FSMA Produce Safety Rule.

• February 23th- 25th, daily from 2:30 pm to 5:30 pm
  https://psa110420.eventbrite.com

All PSA Remote Trainings require advanced registration. Cost is $25, which includes training materials and certificate of attendance issued by AFDO. Seats are limited. Video and audio capabilities are required.

For questions, contact Taylor Langford at taylorlangford@ufl.edu

Training materials and certificate are funded through the Florida Department of Agriculture and Consumer Services (FAIN #U18FD005909)
Thursday, February 11, 2021
Noon – 1 p.m.

**Speaker:**
Jake Price
UGA Extension County Extension Coordinator and Agriculture Agent, Lowndes County

**Moderator:**
Joshua Dawson
FVSU County Extension Agent, Lowndes County

**Topics:**
- Citrus tree wraps
- Results of the 2019-2020 owari rootstock trial including:
  - total yield
  - percent culls
  - fruit size
  - yield efficiency


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

Watch the simulcast: [facebook.com/pg/FVSUCAFST/videos](facebook.com/pg/FVSUCAFST/videos)
I think we can all agree on one thing. It’s good to have 2020 behind us and we can all hope that 2021 is a much better year. We know there will be challenges, but by applying what we have learned, and keeping our nose to the grindstone we will survive and thrive.

One of our great lessons learned in 2020 is the fact that we HAVE to grow high quality citrus. The retail buyers (chain stores and consumers) are demanding high quality fruit in looks and taste. They definitely want fresher fruit and fruit that is shelf stable for a good length of time.

Our role in quality fruit starts right now. There are a number of things we can do in these cold months to be ready to make high quality fruit. Pulling soil samples, checking irrigation systems, calibrating sprayers, and scouting are just a few. Also, check with your chemical companies to be sure they will have the proper chemicals in stock when you need them. Time for the pre-bloom fungicide application will be here before you know it. Get with your nutrition specialist and develop your nutrient plan for the year. Make sure your wells are in good shape.

If your trees are like mine, they are showing signs that the nutrients have been leached out. With excessive rain and freeze protection watering, there is very little left in the soil. Be prepared to feed them as soon as the weather allows and the cold weather has passed.

Kim Jones, CHCA President
As far as 2020 production is concerned, most everyone was pleased with their yields on mature trees. Most of them produced good quality and some even record breaking yields. Although there were a few with some alternate bearing signs, but overall it was really good.

Biggest lesson learned in 2020: **Do not need to allow juvenile trees to produce.** Buyers are demanding fruit from mature trees. And for one simple reason: CONSISTENT TASTE!!

Remember that we are building an industry and in doing so, our reputation is on the line. Let’s all commit to doing the right thing and put only **high quality mature fruit** on the fresh market.

The Cold Hardy Citrus Association grant is approved and under way. Where and how to spend the money in the most effective way is super important and we have had several calls to get it started. You will hear much more about this in the coming months.

As always, let’s all remember to support the Cold Hardy Association in any way you can. Volunteering to serve in committee work, talking with other growers and suppliers about joining the association, and paying our dues in a timely manner help make it possible for us to continue to represent you and help promote this emerging industry. There is strength in numbers!

Please let me know if we can help in any way.

-Kim B Jones
President,
Cold Hardy Citrus Association