

COLD HARDY CITRUS CONNECTION



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ASSOCIATION CORNER**

I hope everyone is staying cool in this summer heat! I am excited to share that I have transitioned into a new position with UF/IFAS Extension as a Multi-County Commercial Horticulture Agent based out of Gadsden County! This new role will allow me to focus on truly supporting the growing citrus industry in our region. I'm beyond excited for the opportunity and look forward to working with everyone even more! In this edition of the Cold Hardy Citrus Connection, you'll find an update on summer fruit drop and information on the first confirmed canker findings in Georgia. You'll also find information and save the dates for several upcoming grower meetings. And, as always, please don't hesitate to reach out to our team if we can help in any way!



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Summer/June Drop in Cold Hardy Citrus: Nature's Way of Thinning to Manage Crop Load

By: Dr. Muhammad Shahid, UF/IFAS NFREC Horticulturalist and
Dr. Fernando Alferez, UF/IFAS SWFREC Horticulturalist

Typically, Citrus flowers profusely in the spring, but only a very small percentage (less than 2%) will reach full maturity. You could say, that about 98% of flowers are dropped in the form of fruitlets, flowers, immature, and mature fruits. Fruit/flower drop varies from year to year depending upon the crop load, heavy blooming may lead to less fruit setting compared to the year with less blooming.

Citrus does not drop all of its fruits at once, but in different phases. Here are a few ways it could occur. (i) Post-bloom drop: It occurs immediately after flowering, causing drop of very small flowers. In general, it is associated with natural over production but in some cases, it could be due to the fungus *Colletotrichum acutatum*. (ii) Summer or June Drop: This phase of fruit drop starts 1-2 months after blooming causing drop of small young fruit (around 1 cm in diameter) from the tree (Figure 1 and 2). June drop typically occurs earlier in May in the state of Florida, which is linked with typical subtropical conditions. This drop comprises about 10% of total fruit drop in citrus. (iii) Preharvest fruit drop: This type of drop occurs when fruit is almost mature and ready to be harvested (Figure 3). This type of fruit drop is of economic importance for citrus producers, as can cause severe reduction in yield. The causes for fruit drop at this stage are not fully understood and are probably complex, including diseases and insect pests along with abnormal temperature and rainfall fluctuations. Particularly, in heavily HLB-infested areas, where trees have a compromised root system that reduces nutrient uptake, it seems advantageous to perform foliar sprays of zinc and potassium as a means to reduce drop and increase fruit size and peel integrity. These treatments are still under investigation, and an adequate time of application needs to be defined yet, as efficacy seems to depend on the variety and its maturation process.

Currently, we are having fruit drop in north Florida starting from May in some groves, which is actually a June drop, but it starts earlier due to abrupt changes in temperature. May and/or June drop is kind of a natural strategy of fruit thinning or crop load management to minimize competition for carbohydrates. Developing fruits compete for photoassimilates (carbohydrates) and the fruits that fail to achieve a specific level of carbohydrates tend to drop. Since it is a natural physiological strategy for crop load management, there is no need to be worried about May/June drop because it's not going to affect production. Also, it is not recommended to apply any fertilizer or growth regulator to minimize summer/June drop, otherwise it will cause reduction in your production by limiting fruit size.

June Drop (Continued)

However, if you are observing heavy fruit drop then it could be due to water and/or nutritional stress, you will need to irrigate well. Particularly during hot weather and strong winds. Also, apply the plants with balanced fertilizers that have micro-nutrients.



Figure 1: May drop in 'Owari' Satsuma. Credit: Muhammad Shahid



Figure 2: June drop in 'Sugar belle'. Credit: Muhammad Shahid

Citrus Canker Confirmed in Georgia



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EXTENSION

By: Dr. Jonathan Oliver, UGA Fruit Pathologist

On June 14th, 2022, the Georgia Department of Agriculture (GDA) announced that citrus canker has been confirmed within a commercial citrus grove in Decatur County, Georgia. This bacterial disease, which is subject to USDA-APHIS quarantine regulations, is widespread within Florida, and has also been found previously in Louisiana (2014), Texas (2016), Alabama (2021), and in a South Carolina nursery (2022).

Leaves with potential citrus canker symptoms (Figure 1) were first identified on May 17th, 2022, and leaf samples were initially tested at both a University of Florida laboratory and at the University of Georgia Plant Disease Clinic in Athens, Georgia. Positive samples were then forwarded to USDA-APHIS for official confirmation of citrus canker. According to the GDA announcement, the USDA-APHIS Plant Protection and Quarantine (PPQ) laboratory has officially confirmed the presence of the citrus canker bacterium in the symptomatic plant tissue.



Figure 1. Citrus canker lesions on grapefruit leaf from Decatur County, Georgia (Picture by Brian Hayes – UGA Cooperative Extension)

As federal guidelines require surveys to determine the extent of citrus canker establishment in the state, GDA and USDA-APHIS PPQ personnel have begun conducting a survey for citrus canker infected trees in the area of Georgia where it was first confirmed.

Citrus canker primarily causes lesions on the leaves, stems, and fruit of citrus. Severe infections can cause defoliation, shoot dieback, and fruit drop, but these symptoms are relatively rare. Leaf lesions are raised pustules that occur on both leaf surfaces (though they may be more pronounced on the lower leaf surface) (Figure 2A). Eventually, the lesions become corky and a crater (sunken area) may be present in the center (Figure 2B). A water-soaked margin may develop around the necrotic tissue (Figure 2C), and a yellow halo often surrounds the lesions (Figure 2D). Lesions on fruit (Figure 2E) and stems (Figure 2F) are visually similar to leaf lesions.

Citrus Canker Confirmed in Georgia



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By: Dr. Jonathan Oliver, UGA Fruit Pathologist

Grapefruit and trifoliolate orange are considered highly susceptible to canker, while lemon, sweet orange, and sour orange are considered moderately susceptible. Mandarins and satsumas are considered to be tolerant or moderately resistant. Nonetheless, even satsumas and mandarins can become easily infected if wounds are present, such as those caused by the citrus leafminer – a very common insect pest of citrus (see below).

The pathogen that causes citrus canker, *Xanthomonas axonopodis* pv. *citri* (Xac), can be spread easily from tree-to-tree and/or between groves by wind-driven rain (including tropical storms and hurricanes), overhead irrigation, human movement of infected plant material, movement of contaminated equipment within and between groves, and by movement of humans, birds, and other animals. In particular, the citrus leafminer can create openings that allow for infection with the citrus canker bacterium (Figure 3).

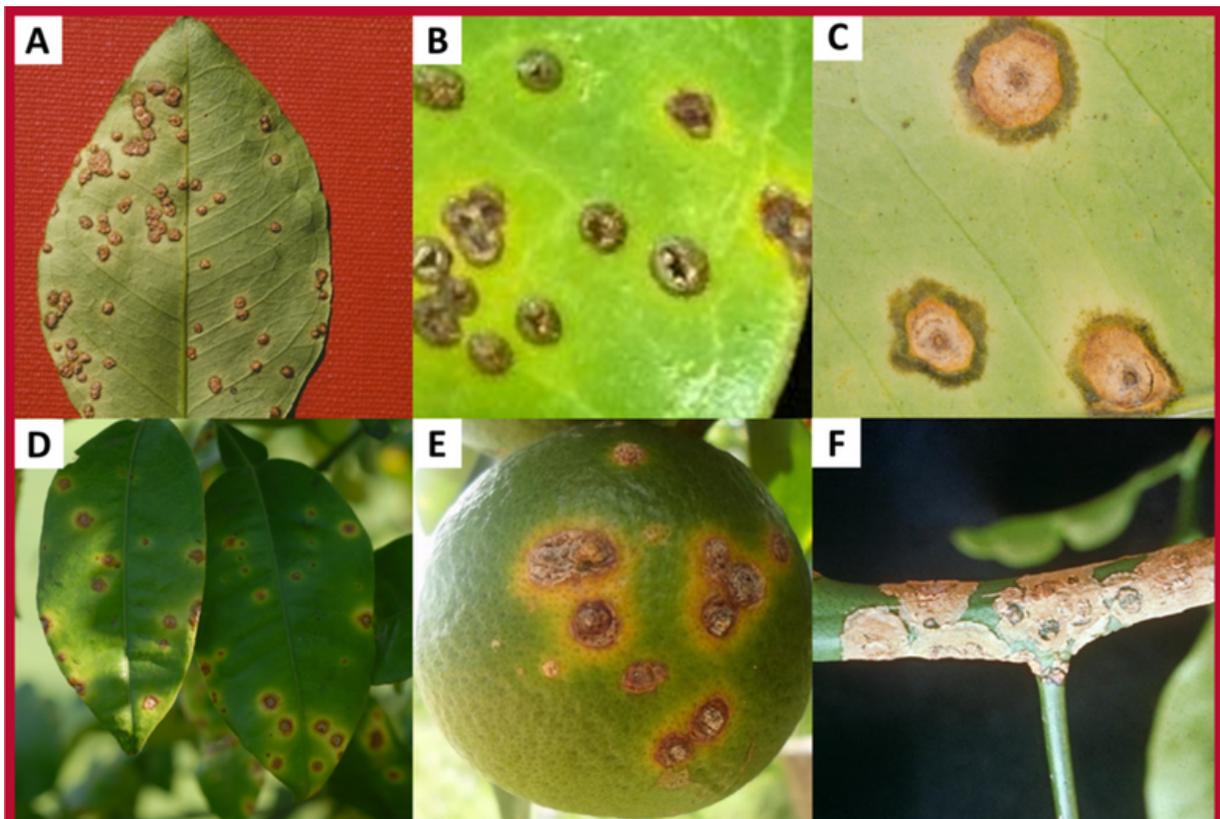


Figure 2. Citrus canker lesions. (A) Raised canker lesions on lower leaf surface. (B) Corky lesions with crater in center. (C) Water-soaked margin around necrotic area. (D) Yellow halos around leaf lesions. (E) Canker lesions on fruit. (F) Canker lesions on stem. Photos A, C, E, and F from Bugwood.org. Photo B by Brian Hayes – UGA Cooperative Extension, Photo D by Raj Singh – LSU AgCenter.

Citrus Canker Confirmed in Georgia



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By: Dr. Jonathan Oliver, UGA Fruit Pathologist

Due to the potential for citrus canker to spread between infected trees and groves, and its potential to impact the marketability of fresh citrus fruit, Georgia citrus growers (both commercial and residential) are strongly encouraged to scout their trees for any signs of citrus canker. Since Xac does not systemically infect citrus trees (meaning it may be present on some parts of leaves or fruit without being present elsewhere on the same tree), any samples selected for citrus canker testing should show symptoms of citrus canker. **If canker is suspected, growers should contact their local University of Georgia Extension Agent for more information about citrus canker diagnosis and testing.**



Figure 3. Citrus leafminer damage on citrus leaf. (A) Leafminer damage [top left] with numerous citrus canker infections, (B & C) Leafminer damage without citrus canker. Photo A by T.R. Gottwald – USDA-ARS. Photos B & C by Jonathan Oliver

Upcoming Grower Meetings

Citrus Growers Summer Update

July 28th 12:00-3:15PM EST

UGA Extension Lowndes County, Valdosta, GA

See Flyer on Following Page

Citrus Expo - August 17th - 18th

Fort Myers, FL

[Click Here For More Information and To Register](#)

North Florida Annual Citrus Workshop - October 13th

Topics: soil fertility, marketing techniques, advanced soil
augmentation techniques

UF/IFAS Taylor County, Perry, FL

Produce Safety Alliance Grower Training

October 26th 2:30-5:30 PM EST

UF/IFAS NFREC-Suwannee Valley

[Click Here For More Information and To Register](#)

Cold Hardy Citrus Field Day - October 27th

UF/IFAS NFREC-Quincy

Topics: Citrus grove tour and Artificial Intelligence (AI) field
demonstrations



Citrus Grower's Summer Update

Thursday, July 28, 2022

Lowndes County Extension Office
2102 E. Hill Avenue
Valdosta, GA

- 11:30 **REGISTRATION**
- 12:00 **WELCOME, LUNCH, WORD FROM SPONSORS**
Mr. Jake Price, UGA Extension Agent, Lowndes County
- 12:50 **GEORGIA INDUSTRY UPDATE & ROOTSTOCK TRIAL RESULTS**
Mr. Jake Price, UGA Extension Agent, Lowndes County
- 1:15 **DIRECT & INDIRECT DAMAGE TO CITRUS BY INSECTS/MITES**
Dr. Lauren Diepenbrock, UF Extension Entomologist, Lake Alfred
- 2:00 **CITRUS GREENING (HLB) & CITRUS CANCKER: DETECTION IN GEORGIA, DIAGNOSTIC SYMPTOMS, & MANAGEMENT**
Dr. Johnathon Oliver, UGA Fruit Pathologist
- 2:45 **POSTHARVEST HANDLING OF CITRUS FRUIT**
Dr. Angelos Deltsidis, Postharvest Physiology, UGA
- 3:00 **SILICON, A BENEFICIAL ELEMENT FOR COLD-HARDY CITRUS PRODUCTION**
Dr. Muhammad Adnan Shahid, Stress Physiology of Fruit Crops, UF, Quincy
- 3:15 **GEORGIA CITRUS ASSOCIATION UPDATE**
Ms. Lindy Savelle, GCA President

Pre-Registration: \$20.00
Walk-In: \$30.00

Mail Checks to:
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COLD HARDY CITRUS ASSOCIATION CORNER

High quality fruit!!

That is the goal of every grower I talk to. And, it is very important, as we grow our industry, to earn the reputation of high quality fruit grown in this “SWEET VALLEY CITRUS REGION”.

With the discovery of canker in south Georgia recently, we are reminded how important it is to identify any diseases that can damage the crop as quickly as possible.

Canker usually enters the tree through a wound. For example, a leaf damaged from leaf miners can make it easier for the canker to enter.

There are multiple articles and white papers published on canker and other issues like Greening (HLB) and all agree that finding the problem early could possibly help mitigate it.

A good scouting program looking for diseases, nutritional deficiencies, insects, or fungi can help us keep healthy trees. While it will not stop canker or HLB if it is already there, it can help us make better decisions going forward in managing our groves.

With this extremely hot weather lately, the fruit is being exposed to a lot of sun. Consider spraying a sun protectant like kaolin clay or calcium carbonate product to help keep sunburn from ruining your fruit.

Healthy trees produce high quality fruit!



Kim Jones, CHCA President