



*Fruit  
Growers  
of SWFL*

**Published by Collier Fruit Growers**

**March 2024**



COLLIER FRUIT GROWERS

**The Collier Fruit Growers' Meeting will be held  
Thursday, March 21st,  
Starting at 7:00 pm.  
The Greater Naples Fire/ Rescue Station  
14575 Collier Blvd., 34119**

Enter through the east side door of the Administration Building.

Bring tropical fruit or a fruit-based bake item for the tasting table.

Please bring trees, seedlings, plants or fruit for the raffle. Tickets are \$2 for one or \$5 for three.

**Remember: It is time to renew your \$15 annual family membership.**

**The March Meeting for CFG will be held on Thursday, March 21st  
at the North Naples Fire/ Rescue Administration Building.**

This change in the meeting date is required because of the Presidential Primary in Florida.



Matthew Herrman, Tropical Fruit Specialist at the Naples Botanical Garden, will be the speaker at the CFG Membership Meeting on Thursday, March 21. Matt will talk about the new Horticultural Center at NBG, the numerous present and proposed fruit tree collections, the possibilities for the large greenhouse space recently acquired by NBG from the Lipman Tomato Company.

**Please consider donating to the Collier Fruit Growers  
Agricultural, Nutritional, and Wellness program  
through PayPal™ by clicking the button below:**

[Donate](#)

**The Bonita Springs Tropical Fruit Club will meet on the second and fourth  
Saturdays, March 9th and 23rd at 4:30 pm.**

**Bonita Springs Fire Control & Rescue District Station**

**27701 Bonita Grande Drive, 34135**

All the meetings are potluck events.

Remember to pay your annual dues in person or online.

the Bonita Springs  
**tropical fruit** club



The speaker at the Saturday, March 9th meeting of the Bonita Springs Tropical Fruit Club will be Angie Nichols. Angie will talk and demonstrate worming castings and composting used in conjunction with kitchen vegetable waste.

# Fruit Growers' News

**The March Meeting for CFG will be held on Thursday, March 21 at the North Naples Fire / Rescue Administration Building.**

This change in the meeting date is required because the Federal Voters' Primary in Florida will be held Tuesday, March 19, and therefore the Community Room will be unavailable to CFG on Monday evening, March 18th.

**The Annual Fruit Tree Sale** on February 24 at Freedom Park was a huge success with a large variety of fruit trees being offered. Trees from the Fruitscapes nursery on Pine Island, mangoes, and for the first time a variety of coconut from Matthew Reece in Punta Gorda, and Pine Island Nursery in Homestead.

The Fruit Tree Sale almost did not happen this year due to the added difficulties and costs incurred with our dealings with both the City of Naples and the Collier County Department of Parks and Recreation. Possible venues are being investigated for next year's sale. Multiple fruit tree sales are also being considered in reach a large area of the County. If anyone has possible alternate site location(s) for future sales, please discuss it with Michael Cartamil.

**The Club's delayed Christmas Picnic** was well attended. The weather was cooperative with warm sunny temperatures. Grilled fruits and vegetables, along with burgers and beverages were provided by the Club. There was also a wide selection of food dishes and desserts were contributed by the attending members. Another possible picnic is being considered for Saturday, April 6.

**James West visited the Naples Botanical Garden, on Saturday, February 17:** The visit was arranged by Crafton Clift and Matthew Herrman. The visit included a quick tour of NBG's new Horticultural Center and the current collections of Mangoes and Jackfruit. Jim West will be in Naples for just five days before returning to Ecuador. Jim is a well-known horticulturist with an extensive knowledge of fruit trees who resides near Quito, Ecuador. He can accommodate small garden tours at his farm and grove for up to eight people. Ecuador would be a perfect destination for a small group of fruit lovers.

**Members are encouraged to share their successes and failures with others:** We would like to hear from our members on what works or does not work in maintaining their gardens. Fruit-related articles, reviews and comments are always welcomed for publication in the newsletters.

**Avocados in Bloom:** Both Mario Lorenzo and Rodger Taylor have reported that their Nagomi variety of 'Hawaiian Avocado' fruit trees are blooming profusely in the fifth year after they were grafted. There are only a very few of this variety of avocado tree, introduced by Dr. Stephen Brady, in Florida. Time will tell as to its setting of fruit & taste.



**Search for Native European Grape Rootstocks:** In the middle of the nineteenth century a fungus blight affected most all the grape vines throughout the grape vines throughout Europe. The problem was

solved by grafting the grape vines onto American grape rootstocks. In fact, it is now the common practice of almost all the vineyards around the world to use American rootstocks in their grape production. Vineyards on the small remote island of Sant Antioco, located off the southwest coast of Sardegna (Sardinia), in the Mediterranean Sea, were the only ones in Europe not affected by the "Blight" and vignerons continue to grow their grapes on native rootstocks to the present day. The red wine, Intrigu<sup>TM</sup>, made with grapes using native Italy rootstocks is produced and bottled in small quantities by the vineyard 'Carignano Del Sulcis.' The wine is imported by Ambrosi Imports LLC, located in Naples, FL.



## Eating Santols – Fresh, Cooked or in Drinks

Santol fruit is a tropical fruit which is popular in many Southeast Asian countries. It has a unique taste that can be described as sweet and tart, with a chewy texture and large seeds inside. The flesh of the fruit is soft, juicy, and fibrous, while the skin is thick and tough.

When you first bite into a santol fruit, you'll notice its slightly tart flavor followed by notes of sweetness with an almost creamy texture, and very similar to that of mangosteen.

As you continue to eat it, the sourness will become more pronounced but not overpowering. The seeds inside are also edible and have a nutty flavor similar to chestnuts.

One way to eat santol fruit is by simply peeling off the skin and biting into the juicy flesh. This method allows you to savor the natural sweetness of the fruit while also enjoying its tangy flavor. Another popular way to eat santol is by dipping it in salt or sugar, which helps enhance its taste.

If you prefer cooked fruits, then you can try making santol jam or preserve. To make santol jam, simply boil peeled and sliced santol with sugar until it forms a thick consistency. You can also use this jam as a spread on toast or crackers.

While it can be eaten as is, there are also several ways to drink santol fruit.

One way to drink this fruit is by making a refreshing juice or smoothie. To make the juice, simply remove the flesh from the seeds, blend it with water and sugar to taste, and strain out any remaining pulp.

For a santol smoothie, add milk or yogurt to the blended mixture for a creamier consistency.

Another way to drink santol fruit is by fermenting it into wine or vinegar. Santol wine has gained popularity in Filipino cuisine as an accompaniment to traditional dishes like adobo and lechon.

### Santol Wine Recipe

Ingredients:

- 2 pounds of fresh santol [or mangosteen] fruits
- 1 gallon water
- 2 cups sugar
- 1 package wine yeast

Instructions:

1. Cut the santol fruit into small pieces and place them in a large pot.
2. Pour the water over the fruit and bring to a boil.
3. Reduce heat and let simmer for 30 minutes.
4. Add sugar and stir until dissolved.
5. Let the mixture cool to room temperature.
6. Once cooled, sprinkle the wine yeast over the top of the mixture and let sit for 10 minutes.
7. Pour mixture into a sterilized glass jar or jug with an airlock lid.
8. Store in a cool, dark place for 4 to 6 weeks, or until fermentation is complete.
9. Once done, strain liquid through a cheesecloth or fine mesh strainer before serving chilled or at room temperature.

Source: [trygreenrecipes.com/santol-fruit/](http://trygreenrecipes.com/santol-fruit/)



# Aquaponics Systems

Derived from the 'Go Green Aquaponics' Website; Posted February 16, 2023

Imagine a gardening system where one could effortlessly grow lush, vibrant plants and raise healthy, thriving fish within the same closed-loop ecosystem. Who wants to produce organic vegetables and fresh fish in your home? Whether one has a sprawling backyard or just a tiny balcony, aquaponics offers an opportunity to grow a diverse array of produce while protecting the environment.

## Understanding Aquaponics

Aquaponics is a method of growing food that combines aquaculture (the practice of raising fish) and hydroponic (a soilless way of growing plants). Through the combination of these two growing methods, aquaponics offers a way to grow food that is resource-efficient, environmentally friendly, and yields high-quality produce.

## How Does Aquaponics Work?

In aquaponics, the waste produced by fish is converted by the beneficial bacteria into nutrients that plants absorb. The plants, in turn, filter the water for the fish. This creates a closed-loop system that uses 90% less water than traditional agriculture and can produce both fish and vegetables in a small space all year round.

Aquaponics relies on a mutually beneficial relationship between fish and plants. Which involves fish excreting waste that is broken down into vital nutrients that plants use for nourishment. In return, plants act as natural filters that purify the water and allow the fish to thrive in a clean and healthy environment.



## The Benefits of Aquaponics

Here are some benefits of aquaponics.

1. **Sustainability:** Aquaponics uses less water than traditional growing methods and doesn't rely on harmful chemicals or pesticides to produce fresh and healthy fish harvests, fruits, herbs, and vegetables.
2. **High Yield: Aquaponics** can produce a high yield of both fish and plants in a small space all year round (if done in an indoor setup). Plants grow faster in aquaponics systems because of their constant access to nutrient-rich water.
3. **Fresh, Nutritious Produce:** Aquaponic systems can grow a variety of fresh produce that is high in nutrients and free from harmful chemicals because the plants grown in aquaponics are free from fertilizers and other chemicals.
4. **Water Conservation: Aquaponics** is an eco-friendly method of growing food. It uses up to 90% less water than traditional agriculture because the water is recycled through the system.
5. **Reduced Chemical Usage:** In the aquaponic realm, fish waste and beneficial bacteria become the nutritional backbone of plant growth. It's a natural cycle that sidesteps the need for harmful chemicals or fertilizers.
6. **Year-Round Gardening:** Aquaponics allows you to cultivate produce all year, regardless of weather conditions. This uninterrupted growing season means a constant supply of fresh, homegrown goodness.
7. **Space Efficiency: Aquaponics** become your gardening solution if space is a problem. Its vertical growing potential and compact footprint make it a space-efficient marvel. One can stack layers of growth, maximizing yield in even the tiniest of spaces.
8. **Cost Savings:** Aquaponics cuts down on ongoing costs by eliminating the need for traditional fertilizers and minimizing water usage. Plus, the potential for a consistent harvest means fewer trips to the grocery store.
9. **Sustainable Food Production:** In a world striving for sustainable food sources, aquaponics reduces the strain on conventional agriculture, conserve resources, and fosters a harmonious coexistence between food production and the environment.



## Types of Aquaponics Systems

The main types of aquaponic systems are media-based, raft systems, nutrient film techniques, and hybrid systems. Each one of these systems has its own advantages and disadvantages, so choosing the system that best fits the specific needs and space requirements is essential.

### 1. Media Based Aquaponics System

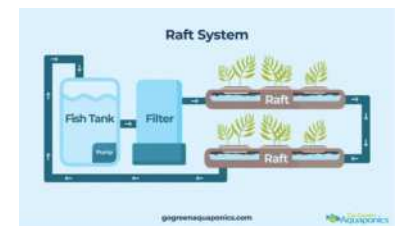
The media-based system is the most popular type of aquaponics system. In this system, plants are grown in a medium, such as gravel or expanded clay pellets, that provide a surface for beneficial bacteria to break down fish waste and turn it into nutrients. The water is then returned to the fish tank.



### 2. Raft System

Also known as the Deep Water Culture (DWC), the raft system of aquaponics is one of the most efficient aquaponics system designs. This system is often used in large-scale or aquaponic farming systems because of its mass production capability.

In this system, the plants are suspended in rafts on top of the water in the fish tank. The roots of the plants dangle in the water, and the beneficial bacteria break down the fish waste, providing nutrients for the plants.



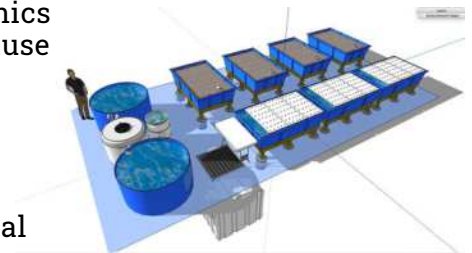
### 3. Nutrient Film Technique (NFT) System

The Nutrient Film Technique (NFT) is a hydroponic growing technique adapted to aquaponics because of its simple yet effective design that works well in some environments. This method uses horizontal pipes (PVC) with shallow streams of nutrient-rich water flowing through them. The NFT is famous for commercial aquaponics and is also helpful in urban places where space and food production are problems.



### 4. Hybrid Aquaponics System

A hybrid aquaponics system combines multiple types of aquaponics systems. Most commercial aquaponics use a hybrid system because of its efficiency and great use of space. One example of a hybrid system is a combination of raft and media-based systems.



## Conclusion

One needs to take the time to fully understand aquaponics; the essential steps to establish and keep an aquaponic garden running smoothly.

As one embarks on their aquaponic adventure, they must remember that each challenge is an opportunity to learn, and every setback is a steppingstone to growth. Whether starting small on a windowsill or a grand aquaponic setup, it is a journey to sculpt, cultivate, and cherish their knowledge of aquaponics.

Refer to the [Go Green Aquaponics](http://gogreenaquaponics.com) website for a beginner's guide to Aquaponics.



## Santol: A closer look at the 'underdog' of fruits

BY: Christian Anthony Cangao, Posted: 'International Tropical Fruits Network,' January 5, 2012

Known for its rich, sweet, tart, and creamy taste, santol is commonly consumed in the Philippines and Thailand. It is mostly eaten fresh – one must suck on the thick flesh covering the seed to get the flavor. However, the fruit's real potential lies in processing its thick pulp to export-quality candy, jam, jelly, or chutney. It also has inherent medical uses and has been found to be a possible cure for cancer.

Santol (*Sandoricum koetjape* Merr.), together with Langsat, is one of the only two edible fruits in the family *Meliaceae*. It is a native to former Indochina and Malaysia and is now found in most tropical countries across Asia. There are 7 species under the genus in India and Malaysia while 2 are in the Philippines. In the western hemisphere, a few specimens have survived in Honduras, Costa Rica, and the American states of Florida, Miami, and Hawaii. Other territories remain undocumented.

### Plant Description

The santol is a medium to large-sized tree that grows vigorously to 15-25m, branched close to the ground and buttressed when old. Trunks can reach a diameter of 80cm or more. Soft hair grows on leaves and young branches. The tree is evergreen but can be considered partly deciduous since it periodically drops all of its leaves at once.

The compound leaves, with 3 leaflets, are alternately arranged in a spiral pattern around the shoot. They grow up to 20-25cm long, elliptic to oblong-ovate in shape, pointed at the tip and rounded at the base. The leaves are light-green when young, dark green when mature, and red or yellow when about to fall. The upper surface is shiny but dull and hairless underneath.

The flowers of the santol are branched in a cluster (called panicle) and form near the shoots. Each panicle is about 15-30cm in length while individual flowers are 1.3cm wide and 1.0cm long. The 5-petaled flower has a mild scent and its color varies from shades of green, white, and yellow.

Technically a capsule, the fruit is round to oblate in shape and flattened at the base. It is green when immature and turns yellow to golden with occasional blushes of pink upon ripening. The outer covering is thick, tough, and leathery pericarp or edible pulp that contains a milky edible sap. The inner fleshy portion consists of a white, translucent, somewhat fibrous, and juicy pulp that adheres to the seed. When eaten raw, the pericarp is sour and mildly acid while the fleshy pulp is sweet and slightly tart. Each fruit contains 3-5 inedible seeds that can be up to 3cm long that contain an embryo of 2 cotyledons.

### Varieties

The leaves of santol change to either red or yellow as it gets old, which determines plant variety. The leaves and the pinkish-yellow panicles of the yellow variety are about 15cm long. The fruit has a thin rind, and the fleshy pulp is 0.6-1.25cm thick around the seeds. On the other hand, the leaves and the light green panicles of the red variety are about 30cm long. The fruit has a thick rind of about 1.25cm and the fleshy pulp around the seed varies. The fruit of the red variety always falls when ripe. In 1958, Philippine researchers documented a santol tree whose fruits remain green even when ripe. The fruit produced is strongly sour.

### Soil and Climate

The santol can thrive in any kind of soil, provided it is well-drained. The tree has been documented to grow well in Florida in acidic sandy soil. However, it grows best in very loose and deep soil with plenty of organic matter.

The tree is very hardy and grows vigorously in both dry and humid regions of the tropics. However, it does not grow well on areas 1,000m above sea level. It grows best if rainfall is well-distributed.

### Propagation

There are many ways to propagate santol: seeds, approach grafting (inarching), air-laying (marcotting), grafting, and budding. Using seeds is not recommended because there's a high likelihood that the plant will yield sour fruits. Approach grafting is the easiest method of asexual propagation but is seldom used. Air-laying is also not recommended since it takes 5-6 months before the air-layer can be removed from the mother plant.

Grafting is the most reliable method for large scale propagation of outstanding trees. Seedling rootstocks should be about 1-2 years old, with stems having a diameter of a pencil. The budwood should be about the same size as the rootstock and should from superior and healthy trees. The leaves of the budwood should be removed 1 week before grafting. New shoots are expected to grow 3-4 weeks after grafting.

Budding is the most rapid method of asexual propagation for santol since almost all buds of the mother plant can be used. The rootstock should be around the same age as the branch that contains the bud that will be used. The buds are cut to about 3.5-4.0cm long. Budding is successful after 1 week.

### Culture

Planting may be done in any month in areas with irrigation. If an irrigation system is not present, it is recommended to plant at the start of the rainy season. Seedlings are expected to grow fast and should be planted 12-14m apart. However, asexually propagated plants can be planted at 8-10m apart.

Before planting, it is a good practice to remove old leaves and prune the mature ones to half of their size. This will prevent water from transpiring out of the plant. During the first 2-3 years, the trees should be pruned to develop more branches. Once the tree starts bearing fruit, pruning should only be done to remove interlacing branches and diseased shoots.



### Vernacular names for Santol

Scientific name: *Sandoricum koetjape* Merr.

Cambodia: kôm piing riëch

Indonesia: sentul, kecapi, ketuat

Laos: loongz

Malaysia: sentul

Myanmar: thi' tou

Philippines: santol

Singapore: sentol

Thailand: kra thon, sa thon, ma, long

Vietnam: sau, faux magoustanier





An area with a radius of 50cm from the plant must always be kept weed-free to minimize competition for water and nutrients. Weeds can also be controlled by planting small crops in between the plants. Various small crops can be planted while the trees are young. But as the tree matures, intercrops should be limited to legumes that fixate nitrogen.

There is no available information on the specific nutritional requirements of santol, but it can be assumed that certain fertilizers can promote growth and fruit production. During the first year, 100-200g of ammonium sulfate can be applied a month after planting and reapplied every 6 months. Once it starts to bear fruit, 500g of complete fertilizer may be used per application. Full-grown trees may require up to 2kg per application.

The most serious pest of santol are gall-forming mites. Galls are abnormal outgrowths that form on the leaves as a reaction to the mite infestation. If infected while the plant is young, growth may be severely inhibited. This can also affect fruit production. Infected plants have been documented to produce smaller fruits. Infected trees should be sprayed with pesticide when new shoots are about to emerge. Fallen leaves should also be collected and burned.

The Caribbean fruit fly (*Anastrepha suspensa*) causes freckle-like blemishes on the surface of the fruit. While this does not penetrate the rind, the fruit looks unsightly on the outside and may not seem apt for consumption.

Other insect pests include root grubs, termites, twig borers, beetles, cutworms, mealy bugs, and aphids. Fungi such as *Corticium salmonicolor* and *Phytophthora phaseoli* produce wilting and blight of leaves, twigs, and branches.

### Harvesting

Trees bear fruit within 5-7 years is sexually propagated and in a much shorter time if asexually propagated. They flower between February to March and the fruits can be harvested by June to October. Fully ripe fruits are yellow to golden brown. They should be allowed to fully ripen on the tree. While full no formal yield record is available, the yellow variety may produce up to 2,400 fruits.

### Food Value

Fruits are usually eaten fresh. It is nutritious, containing a high amount of ascorbic acid, and a decent amount of carbohydrates, iron, and vitamins.

To consume fresh, the seeds of fresh fruits are sucked like a lollipop. Medical practitioners warn consumers to refrain from swallowing the seed as this can get stuck and must be removed by surgery. The rind can also be eaten fresh and is normally dipped in salt or other spices.

In India, it is eaten with spices. The rind is made into jam and jelly. Young fruits are candied in Malaysia. In the Philippines, the fruits are peeled chemically. First, the seeds are removed, and the rind is boiled with sugar. They are preserved in syrup or processed to marmalade for export. Overripe fruits are fermented with rice to make an alcoholic drink. The rind is also used for dishes in several cultures.

### Other Uses

The big canopy makes the santol an excellent shade tree. In the Philippines, it is planted as an ornamental tree in home gardens. The bark is used in the Philippines to tan fishing lines.

The wood can be used for lumber. It is reddish brown when dry, semi-hard, moderately heavy, close-grained, and polishes well. However, it is not durable when exposed to moisture and it is also subject to borers. On the other hand, it is easy to saw and work and is plentiful in some areas. If seasoned correctly, it can be used for light construction, boats, furniture, utensils, and carvings. When burned, the wood releases an aromatic scent.

Different parts of the tree also have medicinal uses. In Europe, the preserved pulp is used as astringent and crushed leaves are used as poultice for treating rashes. In Java, the root is dried, crushed, and mixed with the bark of *Carapa obovata* Blume is used to treat vaginal infections such as Leucorrhoea. The Philippines, the root and the bark is used as remedy for diarrhea and dysentery. The powdered bark is also used to purge ringworms and added to potions drunk by women after childbirth. Fresh leaves are also boiled and added to baths to reduce fever.

In a study done in Okoyama University and Kyoto Prefectural University of Medicine, the extract from the santol bark was found to be a promising cancer chemo-preventive agent. The active compound called triterpenoid significantly delayed the growth of tumors in two-stage mouse skin. In a separate study done in the University of Illinois, the compound found in santol was cytotoxic to a variety of human cancer cells.

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Food Value per 100g of Edible Pulp

	Yellow Type	Red Type
<b>Moisture</b>	87.0 g	83.07-85.50 %
<b>Protein</b>	0.118 g	0.89 %
<b>Carbohydrates</b>		11.43 %
<b>Fat</b>	0.10 g	1.43 %
<b>Fiber</b>	0.1 g	2.30 %
<b>Ash</b>	0.31 g	0.65-0.88 %
<b>Calcium</b>	4.3 mg	0.01 %
<b>Phosphorus</b>	17.4 mg	0.03 %
<b>Iron</b>	0.42 mg	0.002 %
<b>Carotene</b>	0.003 mg	
<b>Thiamine</b>	0.045 mg	0.037 mg
<b>Niacin</b>	0.741 mg	0.016 mg
<b>Ascorbic Acid</b>	86.0 mg	0.78 mg



# Fossil Captures New Ancient Tree Species

## Picture in stone offers glimpse of evolution of plants in North America

BY AYLIN WOODWARD, Published in the Weekend Edition of the Wall Street Journal, February 3-4, 2024.

A fossil of a 350-million-year-old tree was discovered with an unusually bulging top, created by hundreds of near-perfectly preserved leaves surrounding its trunk, that appears straight out of a Dr. Seuss book.

The odd-looking ancient tree species, which predated the rise of the dinosaurs, rose as high as 15 feet but had a trunk just 6 inches in diameter. Swaddling nearly half of the trunk were some 250 leaves, each a whopping 4½ feet long, if not longer.

"That's why we say it kind of looks Seussian," said Patricia Gensel, a professor in the biology department at the University of North Carolina at Chapel Hill who co-authored the study in the journal 'Current Biology' describing the tree species, discovered in 2017 in a stone quarry in New Brunswick, Canada.

The finding of such an old tree with its leaves preserved—rare in the fossil record—provides a snapshot into the forms of very early trees in North America, including those that went extinct, scientists say.

The new tree species, named *Sanfordiacaulis densifolia*, represents one of nature's early—but failed—experiments when it comes to tree forms, according to Colby College geoscientist and lead study author Robert Gastaldo. The earliest trees date to about 390 million years ago.

"This was a biological experiment that likely lasted for a number of millions of years," he said. "But these were not the successful growth forms that made it to the present."

Gensel and Gastaldo said, "The species bore some resemblance to some modern palm trees or ferns."

Its leaves formed a cylinder around the trunk that occupied anywhere from roughly 700 cubic feet to 1,100 cubic feet of space, according to Gastaldo. That's approaching the size of an industrial shipping container.

Most fossilized trees and plants aren't found in such pristine condition. Ancient flora is typically preserved piecemeal in the fossil record—branches, leaves and trunks aren't often found together. Scientists found the specimen near four other fossilized trees of the same species. Gastaldo's group was able to re-create what the *Sanfordiacaulis* tree looked like as more stone was removed from the quarry and brought to the New Brunswick Museum in Saint John for study.

It was unusual for a fossilized tree to be found with the leaves at the top of its trunk, known as the crown, intact, Gastaldo said. Each leaf typically falls off after it stops functioning and dies.

"Trees with their crowns attached in the fossil record are unique," he said. "It's awfully hard to take something that tall and preserve it in its entirety."

Finding Sheds Light on Primeval Ecosystem

The discovery of these trees shed light on the ancient ecosystem in which they grew—a forest where there were much taller trees, around 35 feet in height, scientists said.

"The new species tells us about the space between the top of the forest and the forest floor," said paleobotanist Christopher Berry.

Until these fossils were discovered, lead study author Robert Gastaldo said, "There was little to no evidence of what plants occupied the sub-canopy area during the geological time period these trees lived, about 100 million or so years before the first dinosaurs."

The climate in what was North America around this time was mostly tropical, including widespread coastal swamp forests. These trees, though, lived in the interior of the continent.

"These oddball trees could have helped contribute to their ecosystem's complexity," Gastaldo said.

"This type of understory may have been an ecological niche for the evolution of animal groups on land."

Much as dinosaur bones become fossilized, trees fossilization typically occurs when bits of plants are washed into bodies of water, where they sink and become buried under sediment.

According to the study authors, an earthquake disrupted the land where the trees once grew, on the margins of the deep, prehistoric lake. A mudslide likely patched the trees into the lake, where they sank a couple of hundred feet below the surface. "Temperatures at those depths were quite cold, retarding tree decay," Gastaldo said.

The fossils provide "a very rare snapshot of seeing the actual body form of a plant," said Christopher Berry, a paleobotanist at Cardiff University in the UK, who was not involved in the new study. Berry said he hoped more examples of this tree species can be found to improve researchers' understanding of how closely the trees grew together.



# Lettuce Downy Mildew

## Posted by Jessica Ryals 2/10/2024, Photos by Anna Meszaros

I would like to inform you that Dr. Katia Xavier, plant pathologist at UF/IFAS EREC recently confirmed lettuce downy mildew (LDM) for the first time in this growing season from samples collected in the Everglades Agricultural Area (EAA) by Glades Crop Care crop scouts. This is the time of the year again when environmental conditions are favorable for DM development. Last year it was detected in the EAA at the end of February.

During early stages of disease development, lesions are often surrounded by leaf veins, giving infections a rather angular appearance (Picture 1-2). As the disease progresses, lesions coalesce, and only larger veins obstruct lesion expansion. Lesions become increasingly chlorotic over time and eventually turn brown (Picture 2-3) and necrotic.



Picture 1: new lesions



Picture 2: new and old lesions



Picture 3: older lesions

Lettuce downy mildew is caused by the fungus *Bremia lactucae* which is the class of relatively primitive fungi known as the Oomycetes. Other well-known members of this group are *Pythium* and *Phytophthora*. The fungus is an obligate parasite, i.e., it is capable of infecting and colonizing only living host tissue.

Downy mildew is capable of infecting any growth stage from seedling to mature plant. Head, leaf, and cos lettuce are all susceptible.

When environmental conditions are favorable, a white cottony-like fungal growth indicative of sporulation can be seen on the lower leaf surface (Picture 1). During the early stages, leaf spots are often delineated by the veins of the leaf, giving an angular appearance (Picture 1-2). Lesions become increasingly chlorotic and eventually turn brown (Picture 3). Although downy mildew is most severe on the older outer leaves, the disease may become systemic over time, infecting heads internally.

Prevention and early detection are crucial for management. Because downy mildew is able to spread over large distances in a short period of time, lettuce producers are encouraged to communicate freely with each other and with extension personnel and consultants in the area. Early notification can be a tremendous help in minimizing control costs and reducing the impact of this disease.

When environmental conditions are favorable (i.e., when night temperatures dip into the 40°F to 60°F range and there are at least five to seven hours of high humidity), fungicide applications should begin and continue throughout the duration of the crop. If downy mildew is detected in the area, growers should start a comprehensive fungicide program immediately to avoid severe losses.

The list of fungicides labeled for lettuce downy mildew control can be found in the Vegetable production handbook of Florida, Chapter 9: Leafy vegetable production.

<https://edis.ifas.ufl.edu/publication/cv293>

For more information on LDM, see UF/IFAS EDIS publication:  
<https://edis.ifas.ufl.edu/publication/HS1403>

I also attached a fact sheet based on Dr. Richard Raid presentation he gave on LDM control at the 2022 spring Lettuce Advisory Committee Meeting.

Since labels can change frequently, always read the label before applying any pesticide!

Please notify Dr. Katia Xavier, plant pathologist at UF/IFAS EREC, [kvianaxavier@ufl.edu](mailto:kvianaxavier@ufl.edu) and Anna Meszaros, UF/IFAS PBC commercial vegetable extension agent, [ameszaros@ufl.edu](mailto:ameszaros@ufl.edu) if you find downy mildew on your operations.

# the Bonita Springs tropical fruit club



Feel free to join BSTFC on our **Facebook group**, where you can post pictures of your plants, ask advice, and find out about upcoming events!

<https://www.facebook.com/groups/BSTFC/>

Link to the **next meeting**: <https://www.facebook.com/groups/BSTFC/events/>  
**Meetup** Link (events/meetings sync with the calendar on your phone!):

<https://www.meetup.com/Bonita-Springs-Tropical-Fruit-Club/>

Our **Website** (and newsletters with tons of info):

<https://bstfc.org/>

#### Officers and Board of Directors:

Jorge Sanchez, President  
Mario Lozano, Vice President  
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**Like Us on Facebook!** <https://www.facebook.com/groups/BSTFC/>

## Collier Fruit Growers

The Collier Fruit Growers Inc. (CFG) is an active organization dedicated to inform, educate and advise its members as well as the public, as to the propagation of the many varieties of fruits that can be grown in Collier County. The CFG is also actively engaged in the distribution of the many commonly grown fruits, as well as the rare tropical and subtropical fruits grown throughout the world. CFG encourages its members to extend their cultivation by providing a basis for researching and producing new cultivars and hybrids, whenever possible. CFG functions without regard to race, color or national origin.



COLLIER FRUIT GROWERS

VISIT US AT:  
[www.collierfruit.org](http://www.collierfruit.org)

### REMEMBER TO RENEW YOUR MEMBERSHIP!

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#### CFG Board Members

Kris Boone  
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Marianne Daley  
Jorge Sanchez



CFG Mailing Address:  
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