UF IFAS Extension UNIVERSITY of FLORIDA

Orchard Field Day

Fruit Crop Diversification Options

Finger Lime for Florida

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23 October 2024
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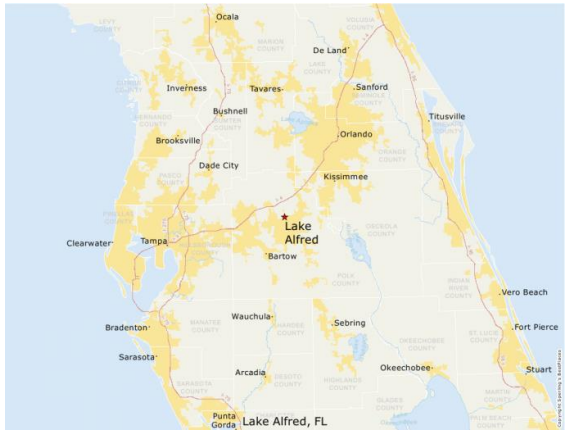

Outline

- What is a finger lime?
- Where did the finger lime originate?
- UF's finger lime development
- UF finger lime varieties
- Post harvesting and Economics updates

What is a finger lime?

- Citrus relative
- Thorny understory shrub or small tree
- The juice vesicles are globular and likened to “caviar”

Graphics: http://www.freshplaza.com/article/150064/AU-Finger-limes-set-to-boom; http://www.thegreenhead.com/2012/03/finger-lime-tree.php

Finger limes origination

Finger lime originated from the rainforests of the border ranges of SE Queensland and Northern NSW

The Finger lime as a specialty crop

- Tolerance to HLB.
- Similar cultural conditions to commercial citrus.
- Increasing demand in domestic and international markets.

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MARKET WATCH

Finger lime: the caviar of citrus

The Australian native, now grown in California in small quantities, is beginning to show up in local markets and restaurants.

December 23, 2009 | By David Karp

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This year, for the first time, you don't have to be a scientist or an Australian to taste citrus caviar from legendary finger limes, as the initial, very small harvest from commercial plantings in California has started to show up at local markets and restaurants.

The finger lime is very different from other citrus, somewhat resembling a gherkin, elongated in shape, and up to 3 inches in length. Its skin is thin and can range from purplish or greenish black, the most typical color, to light green or rusty red. When the fruit is cut in half, the juice vesicles, which are under pressure, ooze out as if erupting from a mini-volcano. Unlike the tender, tear-drop-shaped juice sacs in standard citrus, the translucent, greenish-white or pinkish vesicles in finger limes are round and firm, and pop on the tongue like caviar, releasing a flavor that combines lemon and lime with green and herbaceous notes. The rind oil is also quite aromatic, and contains isomenthone, which is common in mint but rare in citrus.

What do you do with these digit-shaped prodigies? Like other acid citrus, they're really too tart to eat fresh, but even so, the first time you encounter one, try cutting it in half and sucking out the caviar, squeezing it out of the rind like toothpaste from the tube, just to experience the fruit to the fullest. Next

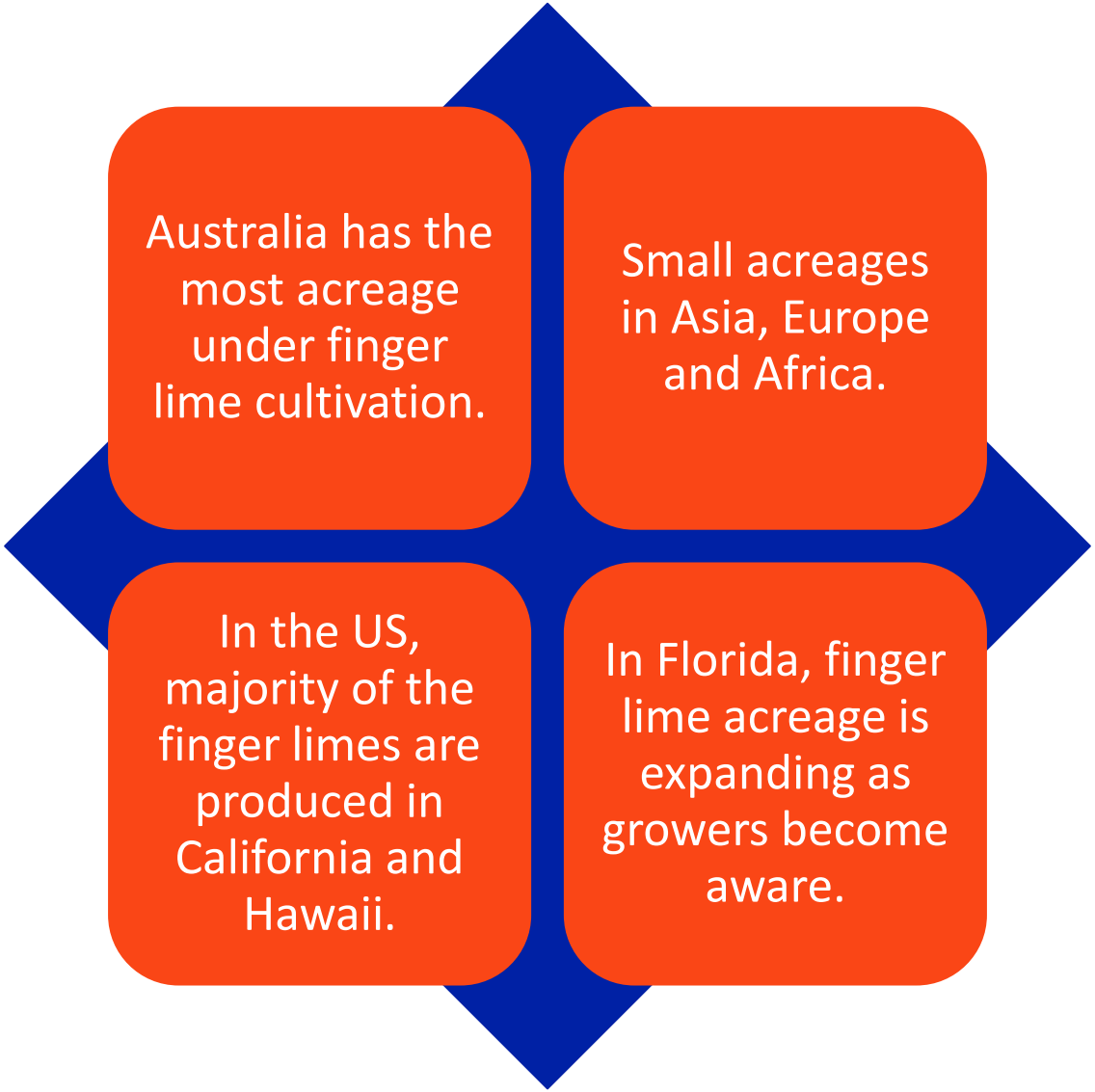
FROM THE ARCHIVES

Market Watch: Boom times for limes
December 2, 2011

Market Watch: Australian finger limes make a splash in...
November 12, 2010

Market Watch: When citrus is past its prime
March 18, 2010

Finger limes from a global context



Finger Limes in California

Commercially cultivated by several growers in the state. Some have their own product label for export.

Mainly harvested twice a year.

Grown on a vigorous rootstock such as Volkamer lemon or *C mac*.

Finger Limes in Hawaii

- Finger lime budded on Volkamer lemon rootstocks.
- Most fruit is internally consumed within the state.
- Finger limes flower and fruit year long and are harvested frequently.

Older Cultivar details - DPI

Variety Clone	Entry Date	DPI Notes
Finger Lime DPI-205-1	6/27/1977	Received from Dr. Prevatt, Florida Southern College in 1977, originally from Australia. Very thorny branches. Small leaves with scalloped edges. Very long and slender fruit. Pear-shaped pulp vesicles, numerous seeds.
Red Finger Lime DPI-50-36	11/4/2003	Sanguinea red finger lime, received seed 11/4/2003, from the National Clonal Germplasm Repository, Accession PI539734, CRC 1484. Microcitrus australasica, var. sanguinea.
Australian Finger Lime 697 CGIP-233	6/21/2017	Introduced from California. Commercial cultivar grown in CA and HI.
Finger Lime Giant DPI-205-4	3/27/2006	This larger fruited selection resulted from a shoot-tip graft of the normal finger lime. Fruit of the giant finger lime is much larger with larger juice vesicles that are more tear shaped than the regular Finger Lime.
Sydney Hyb US	4/25/1983	Originally obtained from Drs. Hutchison and Barrett, USDA, Orlando 4/25/1983 for planting in the arboretum. Seedling line from this introduction. Microcitrus hybrid. Origin: Australia, hybrid of round lime and finger lime.

UF's focus on developing improved finger limes

- Develop new varieties that can grow under the Florida environment.
- Resist HLB and other diseases.

- Two new UF released varieties
  - UF Sunlime
  - UF Redlime

Finger lime for the Florida grower

UF SunLime

UF RedLime

Attractive external appearance that enhances fresh market potential

Photo: T.R. Weeks, UF/IFAS

UF Sunlime unique characteristics

- Makes a medium sized bush; trees at 7 years old were 8 feet tall in Lake Alfred, Florida
- Trees flower sporadically throughout the year, main bloom is February-March
- Yield data is limited; however, a 6-year-old mature tree can produce approximately 150 fruits

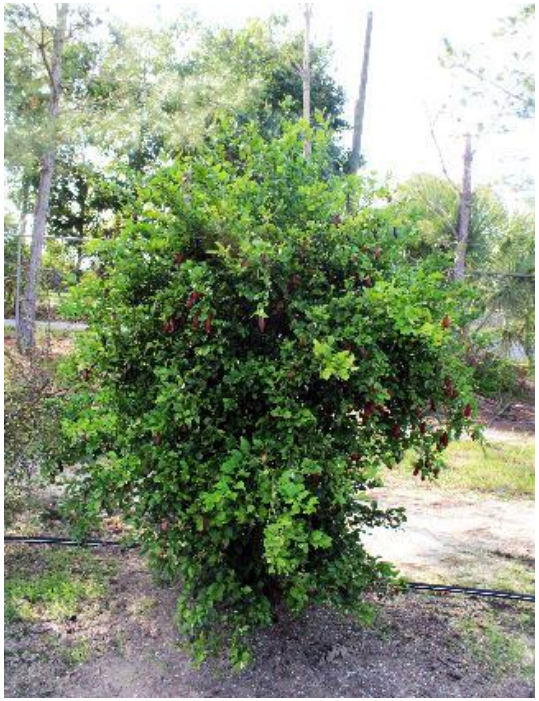
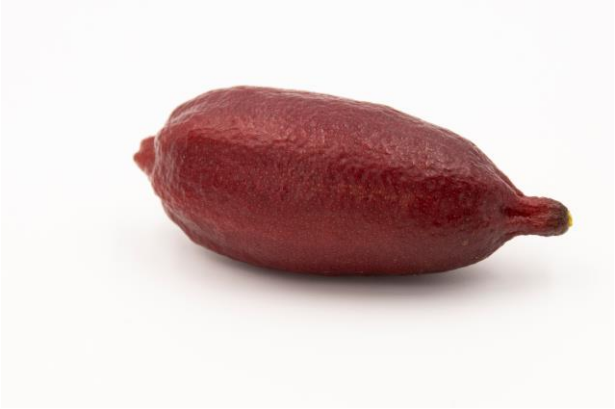


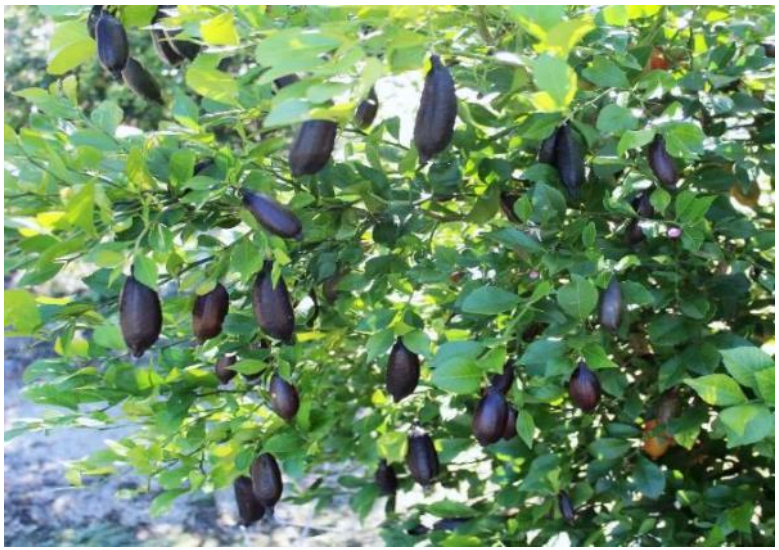
Photo: M. Dutt and T.R. Weeks, UF/IFAS

UF Sunlime fruit

- Fruit
  - Weight: Ranges from 26.14 - 34.66 grams
  - Average length: 2.8 - 3 inches
  - Average number of seeds: Ranges from 0 - 6



UF Sunlime



Immature fruit

Mature fruit

Photo: M. Dutt, UF/IFAS

Mature and immature fruit on the same tree!

Photo: M. Dutt, UF/IFAS

UF Sunlime

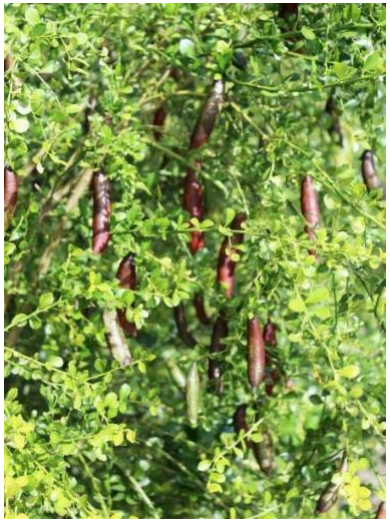
Photo: M. Dutt, UF/IFAS

UF Redlime unique characteristics

- Makes an upright bush with an open canopy
- Plants at six years old were approximately 6 feet tall in Lake Alfred, Florida
- Young flush is always red in color
- Preliminary data indicates trees to be highly tolerant to HLB; no bacterium has been detected in these trees
- Trees flower sporadically throughout the year, main bloom is February-March
- Yield data is limited; however, a 6-year-old mature tree can produce 80-100 fruits

Immature fruit

Mature fruit



Mature fruit in tree

UF Redlime fruit

Fruit

- Weight: 18.72 - 24.10 grams
- Average length: 2.91 – 3.92 inches
- Average number of seeds: Ranges from 0 - 23

UF RedLime at the PCREU, Citra

- Planted in May 2023
- UF RedLime on *Poncirus trifoliata* ‘DPI50-7’ rootstock

UF RedLime at TREC, Homestead

White pulp unreleased selection

- UF KB37
- White pulp
- Tolerant to HLB
- Makes a pretty bush with a pendulous architecture

Cultural conditions

- Can be easily propagated on most citrus rootstocks.
- Nutritional requirements: can do with much less fertilizer and pesticide input compared to conventional citrus.
- Trees begin to flower and fruit within a year after planting. Stable production is obtained after year 3.

6-month-old trees in the field

UF SunLime

UF RedLime

UF KB37

Some issues to be aware of

Photo: M. Dutt, UF/IFAS

From the grower/consumer's perspective

- There is strong stakeholder interest towards cultivation of finger limes, especially in Central and South Florida.
- Many consumers like the tangy flavor of finger limes as they are less acidic than regular limes.
- Chefs and mixologists clearly desire red colored finger limes over other colors as they are very attractive on plates and in drinks.
- Willing to pay high prices for finger limes at least $3 for 1.4 oz. – especially for fresh finger limes.

From the homeowner's perspective

- Can be grown either in pots on in the soil.
- Relatively easy to maintain due to their hardiness.
- Cold protection is needed in the initial years after planting.

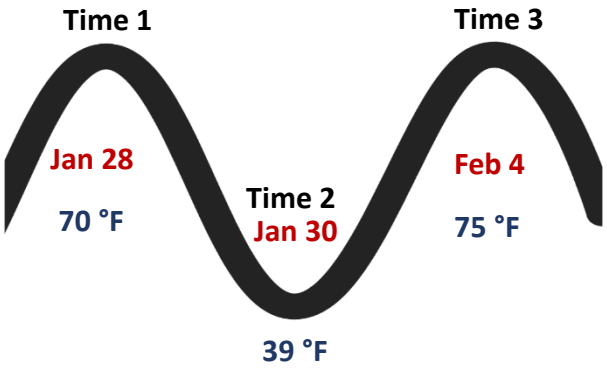
Cold tolerance in the UF finger limes?

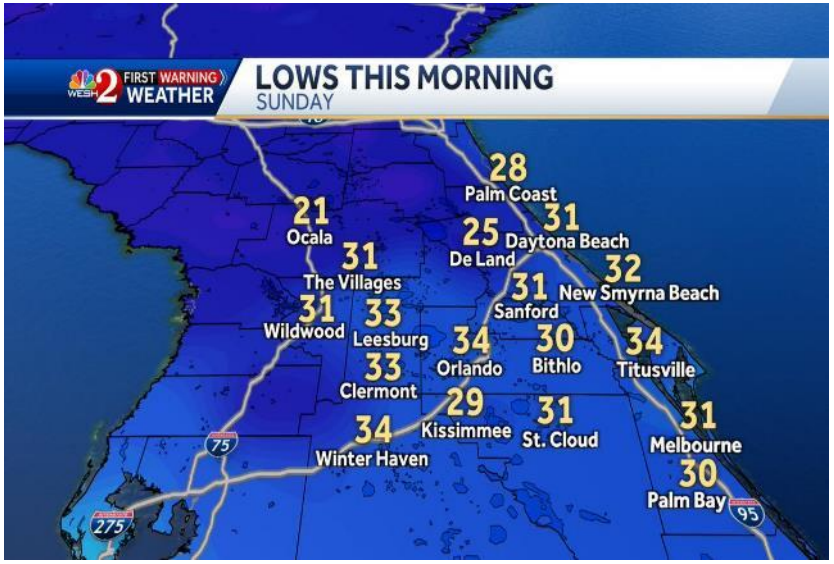
- Finger lime originates from the rainforests of the border ranges of SE Queensland and Northern NSW.
- This region has a sub-tropical climate and freezing events are rare.
- It is unknown if the occasional frost damage can cause twig dieback, which can result in young trees being killed.

FIELD PERFORMANCE

The performance of the UF RedLime and UF SunLime trees was studied before and after a rare 2022 hard freeze.

Time 1 : Day 0 at 70 °F (21 °C),
Time 2 : Day 2 at 39 °F (3.5 °C) and
Time 3 : Day 6 at 75 °F (24 °C)





wind chills ranged from 21 to 32 degrees F (-6 °C to 0 °C)

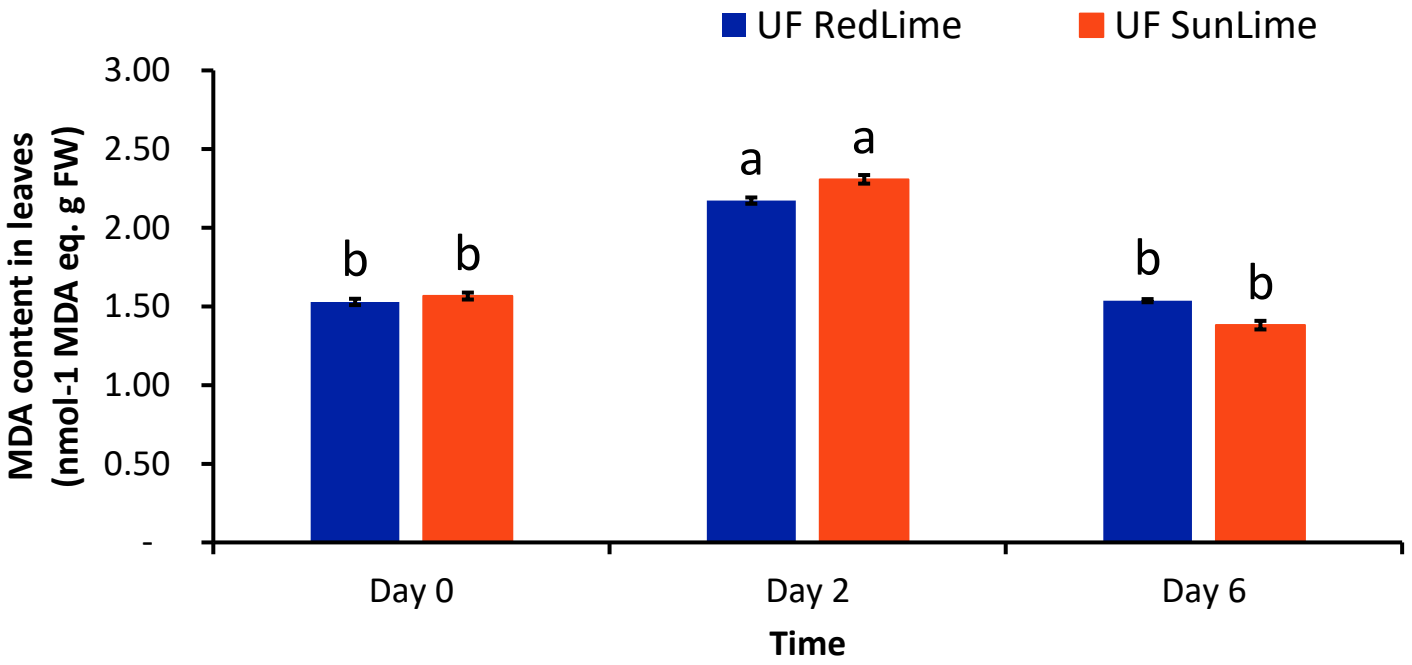
LIPID PEROXIDATION


Time 1
70° F


Time 2
39° F


Time 3
75° F

- The was an increase in malondialdehyde (MDA) during the low temperature weather.
- A decreased MDA content was recorded after the cold wave.



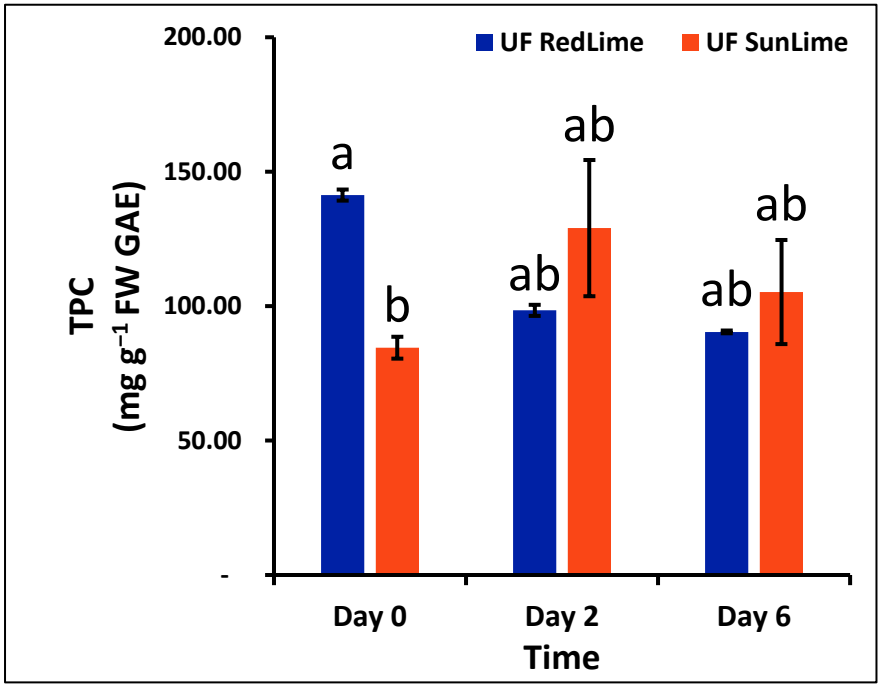
- Following the hard freeze, Finger lime cultivars had increased MDA content.
- Elevated MDA levels suggest that the plant is experiencing stress
- Recovery took place within a week of warmer weather.

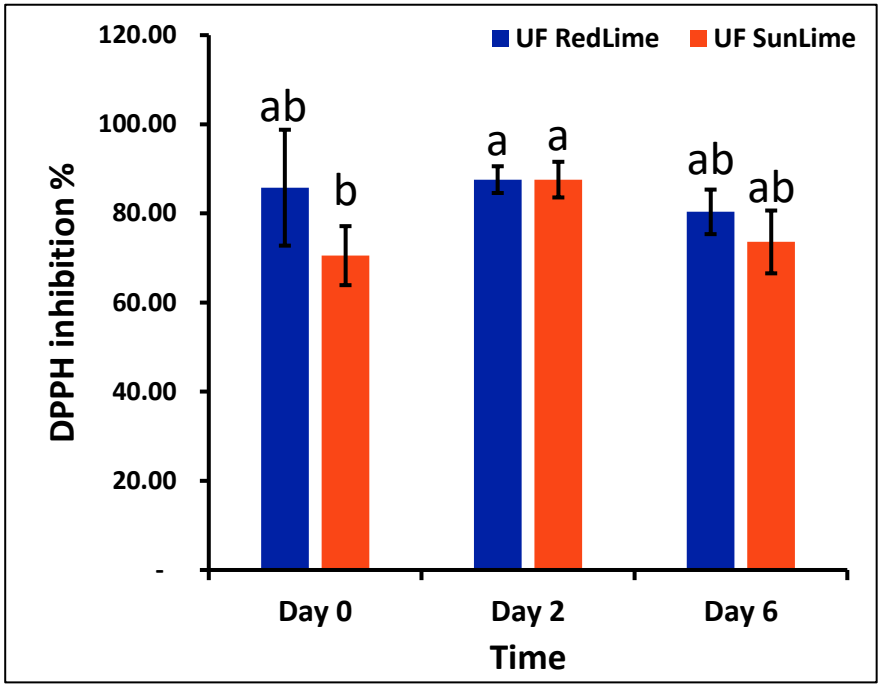
TOTAL PHENOLIC COMPOUNDS, DPPH ANALYSES


Time 1
70° F


Time 2
39° F


Time 3
75° F





Total Phenolic Compounds and **DPPH** can provide insights into the plants' responses to stress and their ability to cope with environmental challenges.

- Measuring these chemicals can indicate how well a tree is coping with the freeze and whether it has activated its defense responses.

Finger lime trees in North and North Central Florida

- Young trees less than 2 years of age will require freeze protection.
- Preliminary data suggests UF SunLime can better tolerate cold as compared to UF RedLime.
- Tip burn of the young flush was observed after a freezing event.
  - Pruning dead areas will help rejuvenate the tree.

Postharvest changes in finger limes under chilling and non-chilling conditions

- Fruit stored at optimal temperature (50 °F) better retained their weight throughout the entire experiment compared to fruit stored at chilling temperature (39 °F)
  - After 3 weeks storage:
    - Were firmer compared to fruit stored at chilling temperature
    - Had more desirable peel appearance (more reddish) compared to fruit stored at chilling temperature

Moshe Doron, Dr. Faisal Shahzad, Dr. Jeff Brecht – UF Horticulture - Gainesville

Investigating the Finger Lime Supply Chain

We surveyed potential finger lime supply chain participants at the Citrus Expo 2024 in Tampa and the United States Bartenders Guild (USBG) Day of Service in Jacksonville. Surveys included: Growers, consumers, mixologists, and extension professionals.

Key Insights from our survey:

- From the groups surveyed, mixologists show the highest interest in finger limes because of their unique flavor profile and visual appeal, while growers and extension professionals emphasize the need for economic viability.
- 41% of growers surveyed plan to grow finger limes.
- 73% of consumers surveyed are interested in buying.
- 36% of mixologists surveyed plan to use finger limes this year.
- 55% of mixologists surveyed are likely to recommend finger limes.

Challenges Identified:

- Price: Concerns that the fruit may be too expensive for some stakeholders.
- Availability: Inconsistent supply remains a barrier.
- Market size uncertainty: Difficulty in estimating the market demand for finger limes affects adoption.

Andres Bejarano Loor, Dr. Lijun Chen and Dr. Suzanne Thornsbury
UF Food and Resource Economics Department - Gainesville

Additional resources

https://australianlimes.ifas.ufl.edu

Scan QR code to visit website

Photo: M. Dutt, UF/IFAS

2025 Finger Lime Field Day

- Tentatively planned for the first / second week of March 2025
- To be held at the PSREU, Citra
  - Educational sessions
  - Field visit

Any questions?

Thank you!