

Finger lime cultivation and cultivars

David Karp, University of California, Riverside

University of Florida Finger Lime Symposium • March 23, 2022



Photo by Toni Siebert-Wooldridge, UCR Givaudan Citrus Variety Collection

Australasian native citrus

- Nine species – 8 *Microcitrus*, 1 *Eremocitrus* – native to Australia and New Guinea
- Mabberley (1997) integrated these species into *Citrus*, but this has not been universally accepted.



Desert lime
Eremocitrus glauca



Finger lime
M. australasica



Round lime
M. australis



Mount White lime
M. garrawayi



Brown River finger lime
Citrus wintersii (*M. papuana*)



Humpty Doo lime – *Microcitrus gracilis*



M. wakonai



Russell River lime – *M. inodora*



New Guinea wild lime – *M. warburgiana*

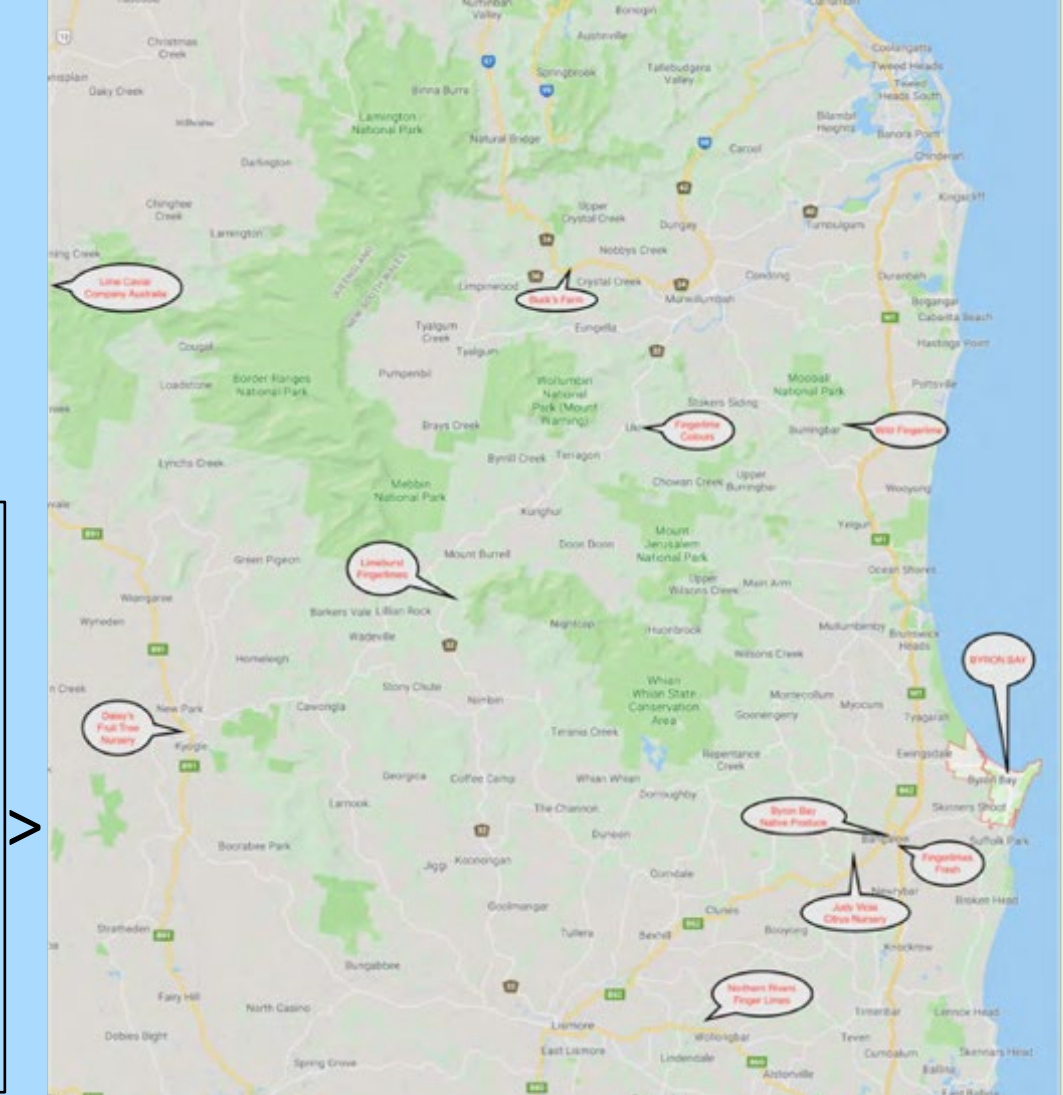
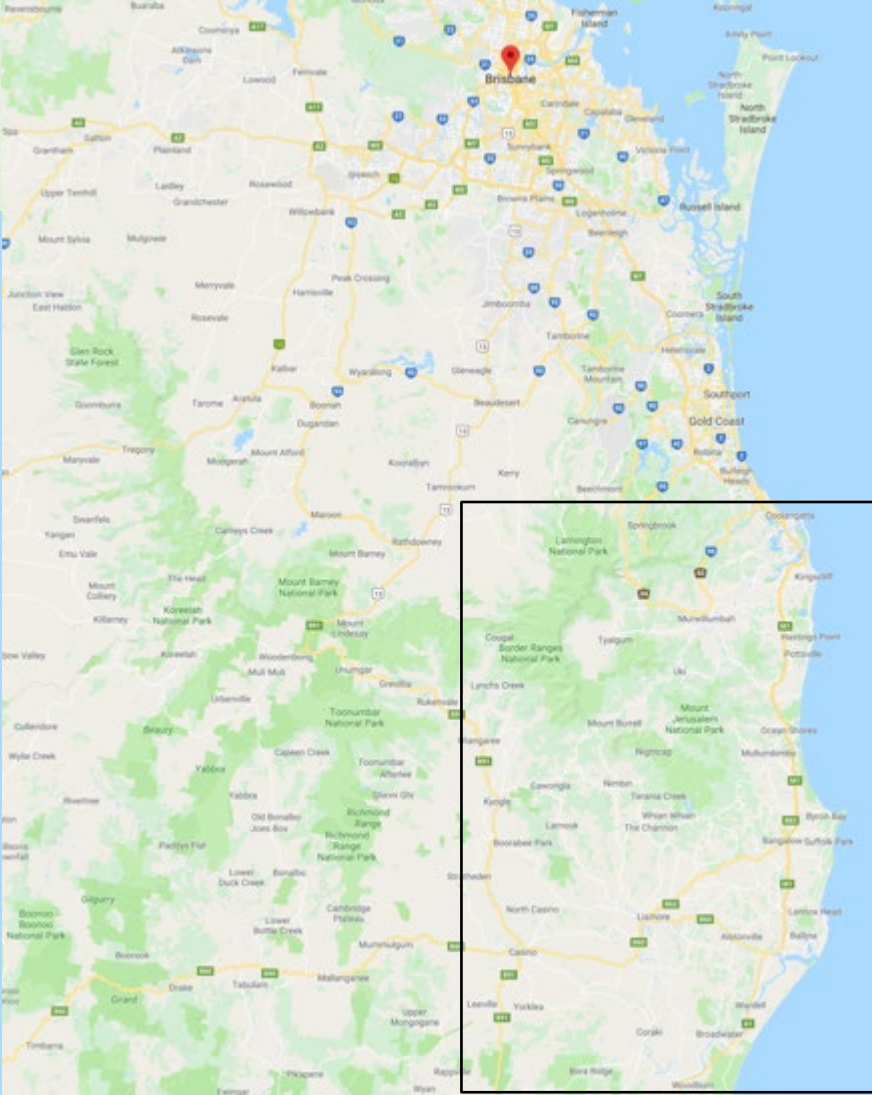
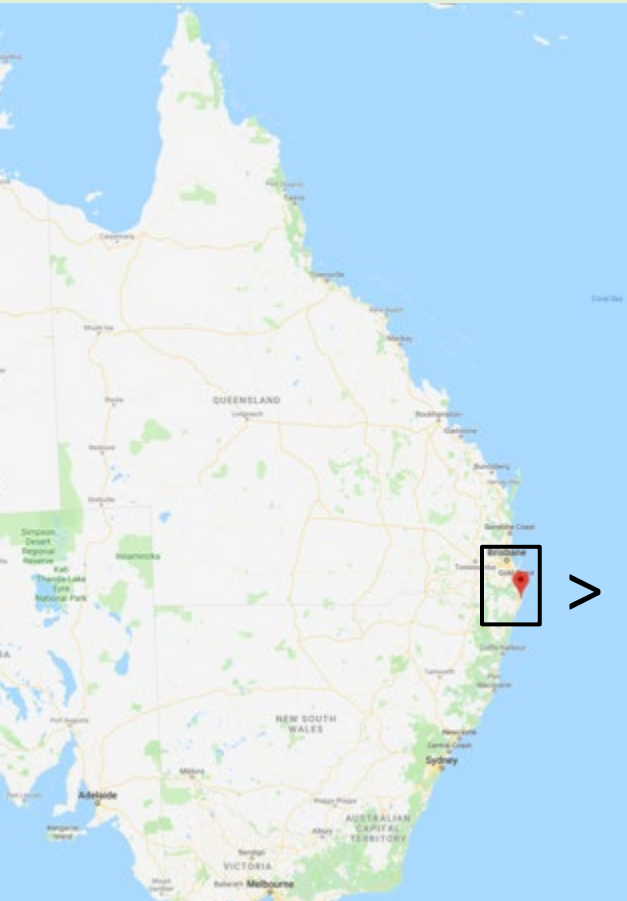
GROWING REGIONS



Source: Crop Industries Handbook

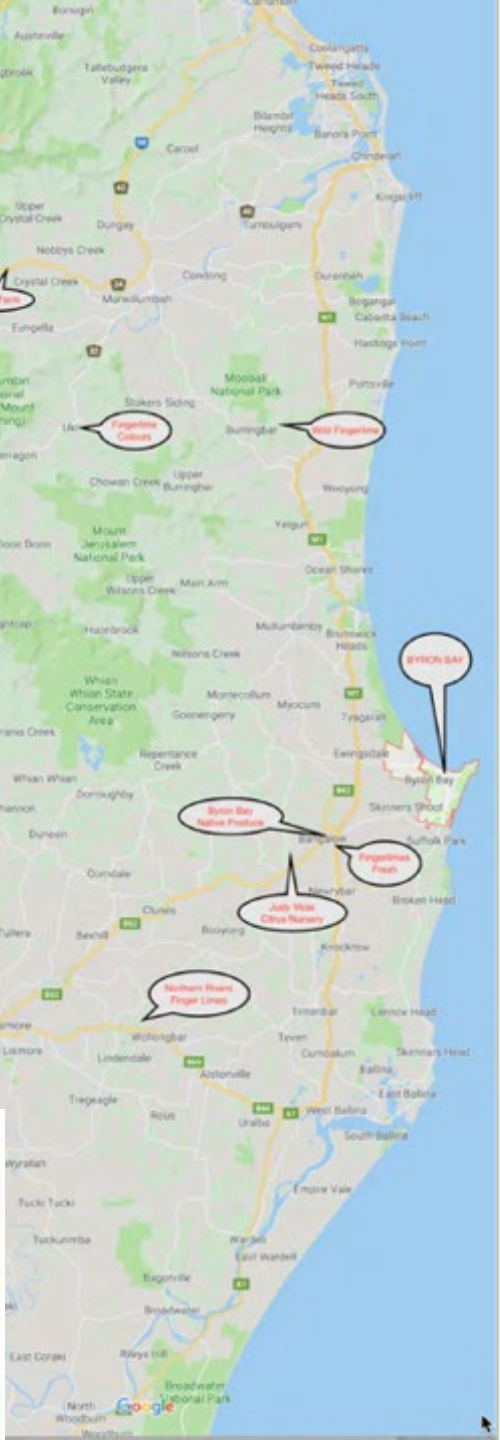
Byron Bay, NSW

Finger lime central



Climate data for Byron Bay (Cape Byron AWS, 2002–present) [\[hide\]](#)

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
Record high °C (°F)	34.0 (93.2)	34.0 (93.2)	32.4 (90.3)	29.8 (85.6)	26.9 (80.4)	25.0 (77.0)	24.1 (75.4)	26.3 (82.9)	32.0 (89.6)	34.0 (93.2)	33.3 (91.9)	34.8 (94.6)	34.8 (94.6)
Average high °C (°F)	27.8 (82.0)	27.5 (81.5)	26.5 (79.7)	23.9 (75.0)	21.2 (70.2)	19.3 (66.7)	18.6 (65.5)	20.0 (68.0)	22.0 (71.6)	23.6 (74.5)	25.1 (77.2)	26.4 (79.5)	23.5 (74.3)
Average low °C (°F)	21.1 (70.0)	21.0 (69.8)	20.0 (68.0)	17.6 (63.7)	14.9 (58.8)	13.1 (55.6)	12.0 (53.6)	13.1 (55.6)	15.2 (59.4)	16.9 (62.4)	18.6 (65.5)	19.8 (67.6)	16.9 (62.4)
Record low °C (°F)	16.5 (61.7)	16.0 (60.8)	14.7 (58.5)	10.9 (51.6)	9.3 (48.7)	6.5 (43.7)	7.1 (44.8)	6.6 (43.9)	9.7 (49.5)	9.5 (49.1)	11.8 (53.2)	13.9 (57.0)	6.5 (43.7)
Average rainfall mm (inches)	164.4 (6.47)	166.6 (6.56)	142.1 (5.59)	183.5 (7.22)	99.4 (3.91)	164.9 (6.49)	96.3 (3.79)	75.4 (2.97)	47.0 (1.85)	95.8 (3.77)	93.4 (3.68)	139.3 (5.48)	1,509.2 (59.42)



More than 75 finger lime cultivars have been named and selected in Australia!



- ASTONVILLE**
- Fruit size 60 - 70 mm
 - Skin black to dark brown when fully ripe
 - Vines bright green, small diameter
 - Fruiting season: March to May
 - Plant Height in the pen: -1.8 m

Astonville is one of the first commercial varieties with a very mild level of acidity that is just right. The fruit is long, narrow and almost round. The tree is tall and narrow with odd finger branches. This variety is difficult to grow as sensitive to stress.



- BYRON SUNRISE**
- Fruit size 60-80 mm
 - Skin black
 - Vines dark red, small diameter
 - Fruiting season: late March to end of May
 - Plant Height in the pen: -1.6 m

Byron Sunrise has fascinating bright red carotenoid that makes this one of the most sought after varieties of finger lime. With a mild lemon taste and low acidity it is an exceptional gem. This slow growing tree is of low vigour and has a narrow canopy. Despite the relatively small size, it produces low fruit.



- COLLETTE**
- Fruit size 60-90 mm
 - Skin black to brown when fully ripe
 - Vines bright green, medium to large
 - Fruiting season: mid March to end of June
 - Plant Height in the pen: -2.8 m

One of the chief favourites due to the optimal balance between acidity and sugars with very low seed count. It has a wide range of culinary uses on our food dishes and garnishes for cocktail drinks. This variety is vigorous and fast growing with an open canopy and long strong branches.



- CRIMSON TIDE**
- Fruit size 60-90 mm
 - Skin black to dark brown when fully ripe
 - Vines dark red, small size
 - Fruiting season: mid March to end of May
 - Plant Height in the pen: -1.4 m

Crimson Tide is variety with very low availability. The long and narrow shaped fruit is almost round with extremely red coloured carotenoid. It is slow growing, dense and bushy tree. It is also quite easy to eat fruit. The tree is tall, vigorous with a well developed canopy and a heavy fruit set. This variety will bear almost all year around but majority of the crop occurs between March and June.



- ENZA**
- Fruit size 70-90 mm
 - Skin black to maroon and when it ripens
 - Vines clear to light pink
 - Fruiting season: mid February to end of April
 - Plant Height in the pen: -1.7 m

Enza has pink carotenoid in the long, slender shaped fruit with a mild citrus flavour. This is an excellent variety that has a regular and heavy fruit set. The tree is of medium vigour and it likes growing in the pen. The canopy is very dense and bush resembling a 'weeping willow' look.



- FLAVOURSLY GREEN**
- Fruit size 60 - 60 mm
 - Skin Green
 - Vines clear to light yellow, small to medium size
 - Fruiting season: March to end of May
 - Plant Height in the pen: -1.6 m

Flavoursly Green is an egg-shaped variety with a mild lemon taste and a distinctive finger lime aroma. The plant is of medium vigour and it will grow well either in pen or garden. This variety has a well developed canopy and a regular fruit set.



- GREEN CRYSTAL**
- Fruit size 80-100 mm
 - Skin bright green to yellow when fully ripe
 - Vines clear, large size
 - Fruiting season: March to end of June
 - Plant Height in the pen: -1.7 m

Green Crystal is an excellent commercial variety with a regular fruit set and large fruit size. The clear coloured carotenoid is also of considerable size. The taste is highly acidic, similar to ordinary lime but with more pronounced aroma. The plant is of medium vigour, quite bushy with a wide spread and dense canopy.



- GREEN GIANT**
- Fruit size 120 - 140 mm
 - Skin green to yellow when fully ripe
 - Vines clear, small to medium size
 - Fruiting season: April to end of May
 - Plant Height in the pen: -2.2 m

Green Giant is one of the longest shaped fruits among the finger lime varieties. The small size carotenoid is slightly acidic with a clear colour. The fruit is usually green, and shiny. It is a very vigorous and tall tree with a fairly light canopy. In the pen should be pruned occasionally to keep the height under control.



- GREEN ORB**
- Fruit size 60 - 60 mm
 - Skin green
 - Vines clear, medium size
 - Fruiting season: March to end of May
 - Plant Height in the pen: -1.6 m

Green Orb is a round finger lime fruit that resembles a traditional lime with its green colour and clear carotenoid. It has a mild lemon taste with characteristic finger lime aroma. The plant is of medium vigour with well developed canopy and regular fruit set.



- JUDY'S EVERBEARING**
- Fruit size 60 - 90 mm
 - Skin dark green to brown when fully ripe
 - Vines clear to red, medium size
 - Fruiting season: March to June
 - Plant Height in the pen: -1.2 m

Judy's Everbearing is a great commercial variety with a very attractive carotenoid ranging from clear to red colour within the same fruit. It has a mild taste and is a great gem on many dishes. It is also quite easy to eat fruit. The tree is tall, vigorous with a well developed canopy and a heavy fruit set. This variety will bear almost all year around but majority of the crop occurs between March and June.



- JULI RED**
- Fruit size 60-80 mm
 - Skin green, going black and dark brown when fully ripe
 - Vines clear to light pink, medium size
 - Fruiting season: March to May
 - Plant Height in the pen: -1.2 m

Juli Red is variety with great potential. Majority of fruit is round. Taste is mild, sweet, like robust dark and carotenoid. Strong growing vigorous plant with long branches and open type of canopy. High yielding variety.



- LITTLE BEAUTY**
- Fruit size 60 - 60 mm
 - Skin dark green to red to brown when fully ripe
 - Vines clear to red, small to medium size
 - Fruiting season: March to June
 - Plant Height in the pen: -1.8 m

Very decorative tree with different colour fruit from black to red - all growing at the same time. The fruit is almost round, and the carotenoid has a mild taste. It has a well developed and upright canopy. This is a late ripening variety with regular fruit set.



- MOON DROPS**
- Fruit size 30 - 50 mm
 - Skin green to yellow when fully ripe
 - Vines clear, small size
 - Fruiting season: March to June
 - Plant Height in the pen: -1.4 m

Moon Drops is decorative variety, with dark green foliage and large size leaves. Low vigour makes it ideal for growing in pen.



- NEW YELLOW**
- Fruit size 60 - 80 mm
 - Skin green to yellow when fully ripe
 - Vines clear to light yellow, medium to large size
 - Fruiting season: March to May
 - Plant Height in the pen: -1.8 m

New Yellow is heavy cropping variety, with mild lemon taste and characteristic finger lime aroma. This variety has an open canopy with regular fruit set.



- PINK ICE**
- Fruit size 80-100 mm
 - Skin dark green to maroon and when fully ripe
 - Vines light pink to red, medium size
 - Fruiting season: March to May
 - Height in the pen: -1.7 m

Pink Ice is a great commercial variety with large fruit and regular fruit set. Carotenoid will bring more colour to the fruit. The taste is mild and slightly bitter, with a grapefruit finish. It grows well in orchards and clear alcoholic drinks such as gin. The plant is of medium vigour with open type of canopy.



- PINK PEARL**
- Fruit size 80 - 100 mm
 - Skin dark green to maroon and when fully ripe
 - Vines pink to red, medium size
 - Fruiting season: March to May
 - Height in the pen: -1.7 m

Pink Pearl is a selection of Pink Ice with darker coloured carotenoid. It is very popular commercial variety with large sized fruit and regular fruit set. The taste is mild with slight bitterness and a grapefruit finish. It's a great addition to cocktails and clear alcoholic drinks, but it can also be used in many other ways. Carotenoid will also bring more colour to the fruit. The plant is of medium vigour with an open canopy.



- RED CHAMPAGNE**
- Fruit size 60 - 70 mm
 - Skin black to maroon and when fully ripe
 - Vines clear to red as it ripens, small to medium size
 - Fruiting season: January to end of May
 - Height in the pen: -1.6 m

Red Champagne is the most popular variety of finger lime. With a mild and subtle taste, it's eating quality are quite versatile and it can also be used fresh. Carotenoid will bring more colour to the fruit. The plant is of medium vigour and with a well developed dense canopy. This variety has a regular fruit set with a long fruiting season. The crop will be smaller during winter months. Red Champagne fruit has one of the longest shelf life of all finger lime varieties.



- RED RUBY**
- Fruit size 60 - 80 mm
 - Skin black to dark brown when fully ripe
 - Vines light pink to dark red as it ripens, small to medium size
 - Fruiting season: March to end of May
 - Height in the pen: -1.8 m

Red Ruby is an excellent variety with medium sized round fruit and a regular fruit set. It produces heavy crop each season. The taste is mild with a subtle citrus flavour. Carotenoid will also bring more colour to the fruit. It is a tall and vigorous plant with a fairly light canopy.



- RICK'S RED**
- Fruit size 50 - 70 mm
 - Skin green to light brown when fully ripe
 - Vines dark red, large size
 - Fruiting season: April to June
 - Height in the pen: -1.5 m

Rick's Red is an excellent slow growing variety that produces short and round fruit, and has a regular and late fruit set. The carotenoid is a very attractive dark red colour and looks outstanding in just about any food combination. It has a very mild citrus taste with a slight bitter, grapefruit finish. Carotenoid will also bring more colour to the fruit. The tree is of medium vigour with a dense bushy canopy.



- DORA ICE**
- Fruit size 60 - 70 mm
 - Skin dark green to orange when fully ripe
 - Vines clear to light pink, medium size
 - Fruiting season: April to June
 - Height in the pen: -1.6 m

Dora Ice produces great quality fruit of uniform size with a mild citrus taste. The tree is of medium vigour with a relatively light canopy density. The fruit ripens quite late in the season.



- ROYAL PEARL**
- Fruit size 100 - 150 mm
 - Skin maroon and to brown when fully ripe
 - Vines clear to light pink, sometimes yellow, large size
 - Fruiting season: April to July
 - Height in the pen: -1.8 m

Royal Pearl is a variety with great commercial potential. It is the largest of the finger lime fruits in OZ Finger Limes collection. The carotenoid has a mild lemony taste with characteristic finger lime aroma. In addition, the seed count is quite low. The tree is of medium vigour with a well developed canopy. It has a regular and heavy crop and ripens quite late in the season.



- SUNSHINE YELLOW**
- Fruit size 60 - 80 mm
 - Skin dark yellow when fully ripe
 - Vines clear, large size
 - Fruiting season: April to May
 - Height in the pen: -1.7 m

Sunshine Yellow has bright yellow fruit against dark green foliage making it one of the most attractive varieties. The canopy is dense and quite evenly shaped. The plant is of medium vigour. This variety is quite sensitive to cold weather and it has grown in more moderate climates.



- SYDNEY HYBRID**
- Fruit size 60 - 50 mm
 - Skin Green
 - Vines common lemon pulp
 - Fruiting season: April to June
 - Height in the pen: -1.8 m

Sydney Hybrid or Australian Wild Lime is a cross between finger lime and Australian sand lime.



- TASTY GREEN**
- Fruit size 100 - 130 mm
 - Skin green to yellow when fully ripe
 - Vines clear, medium size
 - Fruiting season: January to end of May
 - Height in the pen: -1.8 m

Tasty Green is one of larger finger lime fruit sizes. The carotenoid is small, clear, and acidic, but it is not quite as acidic as Green Crystal. The plant is vigorous and develops a dense shaped canopy. For commercial growing it will need a lot of water, otherwise the fruit will stay significantly smaller. This variety will flower all year around and will produce fruit of smaller size during the winter months.



- WAUCHOPS**
- Fruit size 60 - 80 mm
 - Skin black to maroon and when fully ripe
 - Vines clear, medium size
 - Fruiting season: March to May
 - Height in the pen: -2.3 m

Wauchops is the tallest finger lime variety with long upright branches. The canopy is vigorous but the density is on the lighter side. The carotenoid is mild and with a subtle lemon flavour.



- YELLOW**
- Fruit size 50 - 70 mm
 - Skin green to yellow with green patches when fully ripe
 - Vines clear, medium to large size
 - Fruiting season: March to May
 - Height in the pen: -1.9 m

Yellow is a tall and strong growing tree with dark green foliage, medium density canopy and long branches. It is relatively easy finger lime variety. The carotenoid is mild and with a subtle lemon taste.



- YELLOW LIMONNET**
- Fruit size 50 - 70 mm
 - Skin green to yellow with green patches when fully ripe
 - Vines clear, small to medium size
 - Fruiting season: March to June
 - Height in the pen: -1.7 m

Yellow Limonnet is medium size with light density canopy. The fruit has a fairly low seed count and the carotenoid is slightly acidic. This finger lime variety is a bit sensitive to cold weather.



- CHOCOLATE LIMONNET**
- Fruit size 80 - 110 mm
 - Skin green to chocolate
 - Vines clear, medium to large
 - Fruiting season: March to end of May
 - Height in the pen: -1.7 m

Chocolate Limonnet is a medium size tree with a semi open canopy. The fruit has a very interesting dark green, brownish colour. It has a fairly low seed count with a clear taste with a mild sweet flavour. This finger lime variety has a regular fruit set and relatively high yield.

Judy Viola, queen of finger limes

- lives near Byron Bay, NSW
- spent decades exploring for, selecting, testing and propagating finger limes
- huge diversity in size, shape, rind and pulp colors, acidity, season...



Judy Viola in Riverside 2012; photo D. Karp



photos Judy Viola

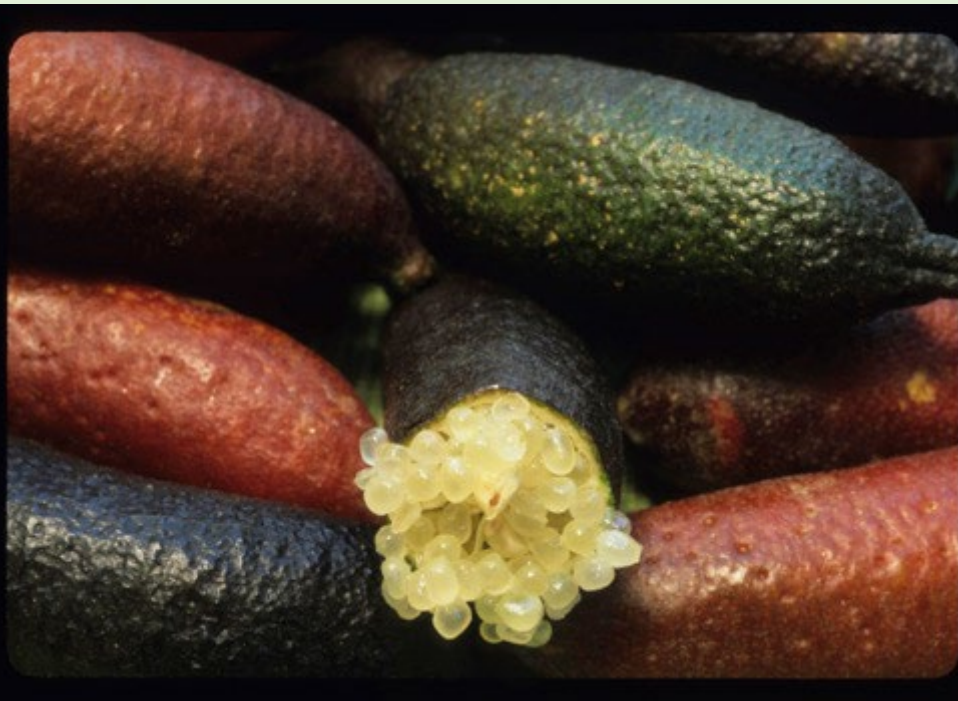
“Australian finger lime” – *Microcitrus australasica* (var. *sanguinea*)

aka CRC 3672 / PI 312872 / VI 697 / CGIP-233; “the old UCR cultivar”

- Introduced from Australia as germplasm, with possible use for breeding rootstock
- Sent c. 1965 by “W.V. Mungomery [sic], Dept. Ind., Mayborough, N.S.W., Australia...from North Arm, Murwillumbah, N.S.W.”; CVC received budwood from Dr. Joe Furr, USDACS, Indio, CA (from Yuma, Arizona), 1968; released by CCPP as VI 697 in late 2004
- California’s only publicly available finger lime, for now
- Rind can be green, black, or red; flesh can be reddish-pink or lime green; seedy or no
- Fruit size can be small, especially inland and when trees are young
- Season at Riverside: some year round; peak Oct. to Dec.



Mud Creek Ranch, Santa Paula, CA, at the Santa Monica farmers market 10/21/09



Citrus Variety Collection (CVC) 11/15/02



CVC 5/7/18

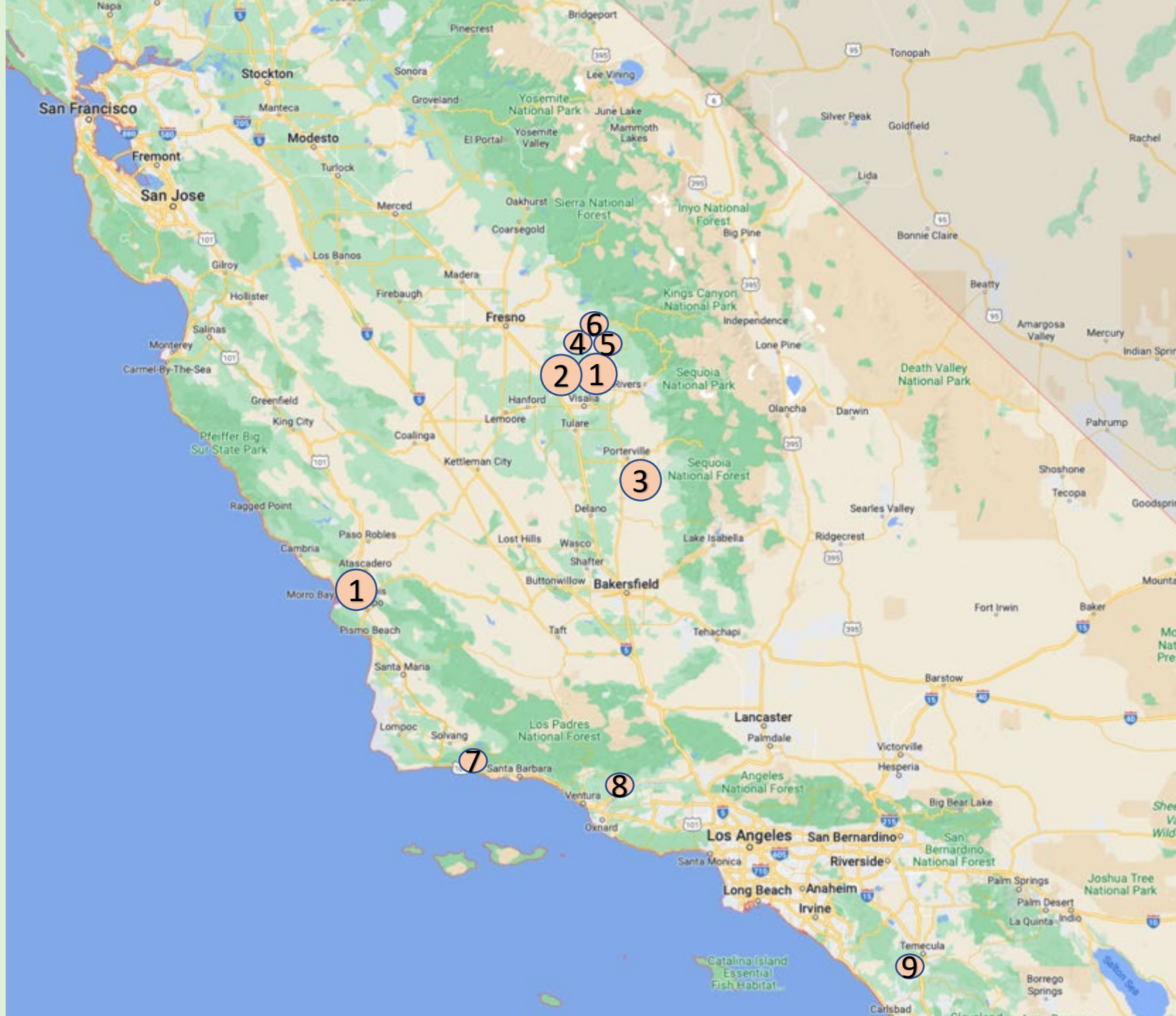


Venice Hill Ranch (J. Shanley), Visalia, CA. 12/11/08

California finger lime growers

- 1 Shanley Farms
- 2 Phillips Farms
- 3 Deer Creek Citrus (Setton Farms)
- 4 Rising C Ranches (Fruition Sales)
- 5 Geneva Shannon
- 6 Citri-Care
- 7 Goodland Organics
- 8 Fig Tree Farms
- 9 Wallace Ranch

- No one keeps official statistics on finger limes in Calif., but there are ~25,000 to 30,000 finger lime trees, 60 to 100 acres.
- Until 2021, all commercial production was of one cultivar, VI 697.
- Many smaller growers sell at farmers markets and farm stands.



Shanley Farms

- James J. Shanley and daughters
- Grows in Morro Bay, CA and Visalia, CA
- Started growing finger limes 2005
- Grows 10,000 finger lime trees (6k Morro Bay, 4k Visalia); ½ bearing
- Varieties: VI 697 (4k); 'Byron Sunrise' (3k); 'Durham's Emerald' (3k)
- Rootstock(s): "I spent a lot of money figuring that out."
- Morro Bay season starts early June; peaks late Aug or Sept through Oct; finishes between Dec and March, depending on weather
- Visalia season starts Aug; peaks Sept/Oct; finishes Dec 15 - Jan 1
- Trees grow better on coast, bigger size and longer season
- Sells wholesale (Europe, Japan, Canada); mail order
- Brother has a patent on machine to extract "citrus pearls"
- Trademark: Citriburst™
- <https://www.shanleyfarms.com>
- Perspective: "When Covid hit, foodservice markets cratered, and 85% of my finger limes ended up on the ground; this year I'll be lucky to sell half. I spent over \$1M on promotion; problem is not enough people go into stores to buy finger limes. If this is a get-rich scheme it has not worked. Commercial prospects are poor."



Venice Hill Ranch, Visalia, 11/18/14



Phillips Farms

- Doug Phillips and family, who grow stone fruit, citrus, kiwis, persimmons...
- based in Visalia, CA (Tulare County); grows in Ivanhoe, Elderwood/Seville
- Grows ~2,500 finger lime trees, ~8.5 acres
- Varieties: CRC 3672 / VI 697 (“not a bad variety, we’ve had some outstanding fruit”); ‘Byron Sunrise’ (will produce next year); ‘Durham’s Emerald’ (starting to bear, tends to dry out at end of season)
- Rootstocks: Volkamer (best – vigorous rootstock with slow-growing top), C-35, trifoliolate (Rich 16-6 / Rubidoux; not good)
- Planting distance: 18 x 8
- Season: start Aug.; peak Sept.-Oct. into Nov., start trailing off as weather cools; sometimes can get some decent fruit as late as late Dec. if no freeze
- Seed problem if multiple finger lime cultivars are planted nearby and cross-pollinate; “other conventional citrus doesn’t seem to affect them”
- Sells wholesale in small clamshells, 4-6 oz, but also in bulk pack
- “Finger lime deal has not been good for me the past few years with the downturn in foodservice”
- Prospect for future: use machine to extract pulp and sell in jars so chefs can use conveniently, and farmers can use second-grade fruit
- <http://phillipsfarms.net>



Deer Creek Citrus (Setton Farms)

- Porterville, CA (Tulare County)
- Owner(s): Joshua Setton and family; farmed by Mike Smith; formerly Lisle Babcock
- Lisle was a major grower of specialty citrus. He sold his farm in 2018 to Setton Farms, which continues to grow finger limes.
- He's now retired and lives in Utah.
- Started growing finger limes in 2007
- Grows 4,750 finger lime trees (10 acres), all VI 697
- Rootstock: Carrizo
- Planting distance: 9 ft. x 16 ft. or 18 ft.
- Season starts July; peaks Aug.; ends Dec.
- Harvested by shaking trees, fruit fell on tarps.
- Lisle's special sauce: "We used a lot of turkey and chicken fertilizer. That really helped the trees grow."
- Certified organic: CCOF
- Sells wholesale, including Organically Grown
- Trademark: Buck Brand®
- <http://settonfarms.com>



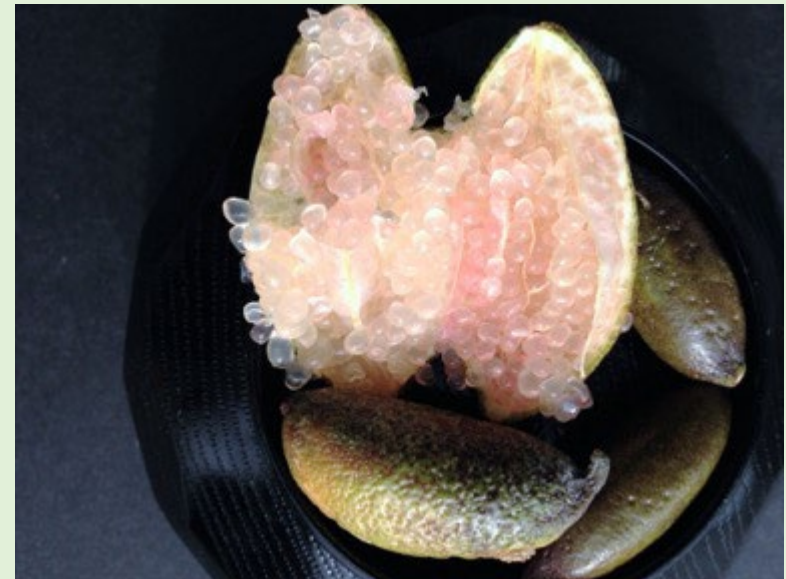
Lisle Babcock, 3-year-old finger lime planting, Deer Creek Heights Ranch, Terra Bella, CA. © David Karp 12/17/09

Rising C Ranches (farming) / Fruition Sales

- Eric and Kim Christensen
- Orange Cove, CA (Fresno County)
- Started growing finger limes 2007
- One of California's leading specialty citrus growers and marketers, but has just 40 finger lime trees (all VI 697; on Carrizo?), and sells for a few other very small plantings
- Season Oct.-Nov.; done by Thanksgiving
- Sells wholesale and by mail order
- Perspective: "Finger limes look good in a food magazine, but they're very pricy, labor intensive, and the fruit grown here is too small. I'm not giving up, and I'm interested in the new UCR cultivars, but Florida will kick our butt (their trees grow faster, they're closer to sea, and finger limes are resistant to HLB). The climate here isn't well suited to growing finger limes; they drop off the trees, and they don't size."



Eric Christensen, Owari satsumas, Navelencia, CA; D. Karp 12/10/15



<https://www.specialtyfoodsoston.com/rising-c-ranch>

Geneva Shannon

- Geneva Shannon & Ron Orlopp; JR Shannon (Eric Shannon Jr.), mgr.
- Ivanhoe, CA (Tulare County, NE of Visalia)
- Planted first block of finger limes in Lemon Cove 2012, sold; put in current planting 3-4 years ago
- Grows 350 finger lime trees, all VI 697
- Season: peak Nov.-Jan., but may get 2 or 3 crops a year; next one May-June 2022? Property on hillside stays warmer.
- Gets large fruit size, thinks it may be due to tighter planting, 12 x 6
- Some fruit has been seedy, perhaps because of nearby lemons, mandarins, and Valencias.
- Horticultural challenges: keeping trees cool and comfortable on hot summer days; wind, fruit get bruised and windburned
- Biggest issue: “finding a consistent way to market the fruit”

photos JR Shannon >



Citri-Care

- Arlen and Katy Miller, mainstream and specialty citrus growers
- Oroshi, CA (Tulare County)
- Planted finger limes 2010
- Grows 177 finger lime trees, all VI 697
- Rootstock: Volkamer
- Season mid-Oct. to end Nov., when they exhaust supply of large ones, don't grow.
- Pack into 1-lb and 5-lb. mesh bags, in master carton
- Sells wholesale, mail order
- "Finger limes have not been a lucrative spot for us, they're small and fall off the tree. Maybe I'll try grafting over to the new UCR cultivars."



Oroshi 12/29/15; photo D. Karp



8/16/20

<https://www.facebook.com/The-Big-Orange-118342878239222>



11/14/19

Goodland Organics

- Frinj Coffee / Jay and Kristen Ruskey
- Goleta, CA (just west of Santa Barbara)
- Also grows coffee, cherimoyas, avocados
- Started growing finger limes 2007
- Grows 400 finger lime trees, all VI 697, all on Carrizo
- Neighbor has 800 finger lime trees
- Season starts May-June, runs through Jan.-Feb.
- Certified organic (CCOF)
- Sells wholesale and mail order
- Uses Apeel to extend shelf life
- Challenges: 1) lack of awareness of fruit, they're not in stores; 2) trees are very thorny, challenging to prune; 3) not enough horticultural information available



photos D. Karp 2010



Jay Ruskey 11/30/10 photo D. Karp

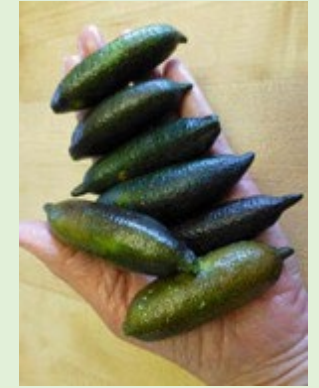


3/17/22 photo Mark Szczerba



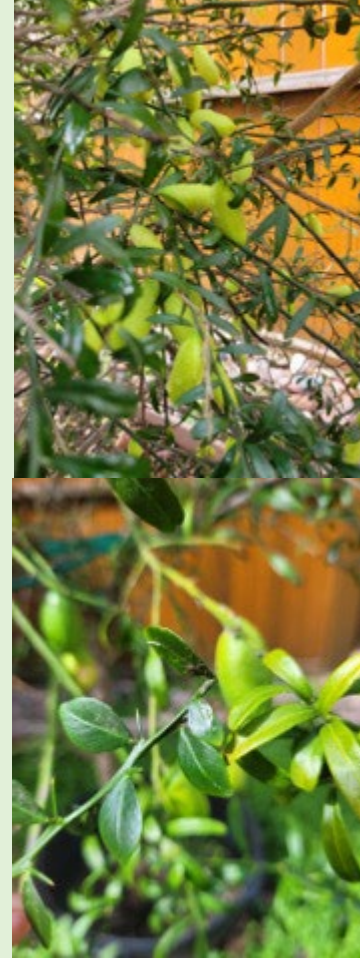
Fig Tree Farms

- Susan Caughey, also grows lemons and avocados
- Santa Paula, CA (Ventura County), 10 miles from ocean
- Started growing finger limes ~2009
- Planted 400 trees, 300 left, all bearing
- All VI 697, on Carrizo / C-35
- Season starts mid-Aug. to early Sept.; finishes late Dec. to Jan., but sometimes as late as Apr., depending on wind
- Sells by mail order only; divides fruit by size into “standard” (0.35-0.49 oz.; \$48/lb.) and “premium” (0.50-0.90 oz.; \$55/lb.) grades.
- Biggest challenges: harvesting very thorny trees, which are also very difficult to prune properly
- <http://www.fig-tree-farms.com>



Wallace Ranch

- Doug and Margaret Wallace planted 200 trees of what they expected would be finger limes ~2010
- Richard Augustus and Neva Day bought farm from Wallaces 2018, main crops dragon fruit, avocados
- Bonsall, CA (north San Diego Co.)
- Half turned out to be an undesirable mystery cultivar or hybrid (FL with 'Eustis' limequat? *Eremocitrus?*); 78 trees of VI 697 remain.
- Interstock is 'Tahitian' pummelo!
- Finger limes bloom year-round; main crop July-Oct.
- Certified organic (Organic Certifiers)
- Sells wholesale to local buyers; 30% of crop is culls, wind-scarred fruit, which sells for \$10/lb; some go to breweries
- <https://wallaceranchdragonfruit.com>



Photos by Neva Day

5/1/11, Doug Phillips, e-mail:
Here are some of the finger
limes I saw in Australia about
2½ hrs. south of Brisbane.
Amazing size and color. The
longest was over 6" and many
were about 1" in diameter.
Interior colors ranging from
white, yellow, various greens,
pink, red and ruby. They even
had subtle taste differences.
Very, very exciting!

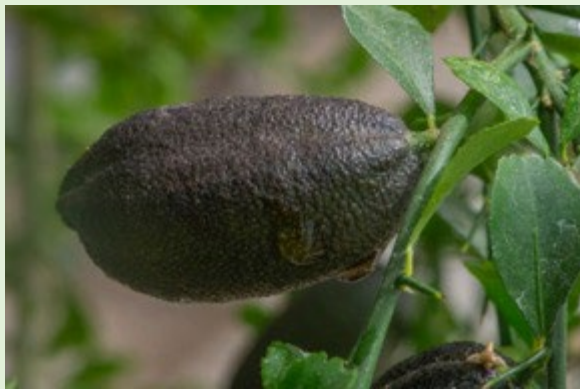


photo Doug Phillips 2011 >



'Durham's Emerald'

- Originated Northern Rivers district, NSW North Coast; introd. 1994 by Judy Viola
- Fruit cylindrical, length 4-8 cm, diameter 15-25 mm, skin firm, black; pulp emerald green.
- Heavy bearer summer to late autumn, with continual light cropping all year around. Vesicles easy to extract.
- No PBR, but registered with Australia Cultivar Registration Authority 2007
- VI 863, Calif. budwood rights owned by Doug Phillips / Jim Shanley, who have put in commercial plantings.



< UCR Rubidoux Citrus Quarantine Facilities 5/24/2019 ^



^ Photo: ACRA > <https://www.anbg.gov.au/acra/acra-list-2009.html>



UCR Rubidoux Citrus Quarantine Facilities 9/28/2012

'Byron Sunrise'

- Originated Alstonville, NSW; selected 2000, Judy Viola
- Fruit cylindrical, length 40-80 mm, diameter 15-25 mm, skin smooth, clean, mottled green/brown to black when fully ripe; juice vesicles dark red, small; acidity low
- Tree vigor low; growth habit upright, narrow
- No PBR, but registered with Australia Cultivar Registration Authority (ACRA) 2010
- VI 942, Calif. budwood rights owned by Doug Phillips / Jim Shanley, who have put in commercial plantings.



< Photos: Judy Viola



Photo: ACRA > <https://www.anbg.gov.au/acra/acra-list-2009.html>

New USDA/UCR seedling cultivars coming soon



HAWAII

Wailea Agricultural Group

- Michael Crowell, grows heart of palm, tropical fruit, and flowers
- Honomu, HI (north shore of Big Island, north of Hilo)
- grows 100 trees finger lime, all VI 697 from TreeSource in Calif., planted ~8-10 years ago
- Harvest year-round, slows down in winter
- Uses All Seasons® spray with calcium, which induces flowering
- Sells mostly to local wholesalers, \$30/lb.
- <https://waileaag.com>



Aloha Honey Bee Farm

- Ollie (Oliver) and Lauren Cohen, rescues bees, grows tropical fruit
- Kilauea, Kauai, HI
- Started growing finger limes 2015
- Grows ~100 finger lime trees, plus 200 in his nursery
- Grows ~10 Australian cultivars, incl. 'Pink Pearl', 'Crimson Tide', 'New Yellow', 'Tasty Green', 'Pink Ice', and "Red Champion" (probably 'Red Champagne')
- Rootstock: trifoliolate
- Season: 'Red Champagne' year-round; some others more seasonal
- "Beyond Organic"
- Sells locally to friends who sell at farmers markets, stores; sales to restaurants and hotels have declined since Covid; price \$30/lb.
- "Wind is definitely a problem, it causes the fruits to be scratched by thorns, or fall off the tree.



"Red Champion" (photo Ollie Cohen)



<https://www.facebook.com/ollie.cohen.10>

More finger lime news from Hawaii

Mahi Pono

Mahi Pono is a “partnership between a California farm management company and a Canadian pension fund”. One of the crops it’s growing on Maui is finger lime.

<https://www.civilbeat.org/2021/02/these-two-companies-are-making-big-investments-in-hawaiis-agricultural-future-will-their-bets-pay-off>



Kauai Nursery has a red-skinned, red-fleshed cultivar, as well as a green one.

https://www.kauainursery.com/_files/ugd/d9a596_d8dbc6c0bd1a49fca284b8c191916450.pdf

USDA-ARS PRA for finger lime from HI

Follett, P.A., Asmus, G. and Hamilton, L.J., 2022. Poor Host Status of Australian Finger Lime, *Citrus australasica*, to *Ceratitis capitata*, *Zeugodacus cucurbitae*, and *Bactrocera dorsalis* (Diptera: Tephritidae) in Hawai’i. *Insects* 13(2):177.

<https://doi.org/10.3390/insects13020177>



Brochure on finger lime cultivation in Hawaii

EXTENSION PUBLICATIONS 

Finger Limes

At a Glance

This publication covers:

- A potential crop for Hawai'i fruit growers
- Uniqueness of the crop
- How to grow finger limes
- Harvesting and handling
- Uses of the fruit and recipes

various recipes. When chewed, the vesicles have an effervescent tangy flavor.

There a number of commercial finger lime operations in Hawai'i, as well as many single tree plantings. Sales to hotel and restaurants are brisk for special events and in holiday seasons. Sales at farmers' markets are stable, but sales to grocery stores have yet to develop. The tree makes an excellent potted plant or hedge pruned to less than six feet.

Finger lime is native to the sub-tropical rainforests of South-East Queensland from Mount Tambourine to the Richmond River in North-East New South Wales. The Bundjalung people who lived in this area of Australia called finger lime "gulalung." They are currently grown in virtually all tropical and sub-tropical climates. In its natural habitat, this hardy understory shrub or small tree is found below the canopy, which can reach 25 feet in most soils. The plant can tolerate most conditions in Hawai'i, at both extreme upper and lower elevations.

Scientific Name and Description

Finger lime (*Citrus australasica*, F. Muell.) was formerly known as *Microcitrus australasica* (F. Muell.) Swingle. The species is a member of the sub-family Aurantioideae in the citrus family Rutaceae.

It has a compact or spreading crown with straight thorns (1/4" long) at the nodes and small narrow leaves (1" by 1/2")



Figure 1. Leaves, thorns, fruit, flower, and halved fruit showing the translucent vesicles.

August 2020
Subject Category:
Fruit, Nut, and Beverage Crops, FN 95

Ken Love
Hawaii's Tropical Fruit Growers

Robert E. Paull
Department of Tropical Plant and Soil Sciences
paull@hawaii.edu, (808) 956-7369

THIS INFORMATION HAS BEEN REVIEWED BY CTAHR FACULTY

<https://www.ctahr.hawaii.edu/oc/freepubs/pdf/FN%2056.pdf>

Florida Finger lime cultivars

Variety Clone	Entry Date	Descriptions
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. The fresh vesicles have the effect of a burst of effervescent tangy flavor as they are chewed. The fruit juice is acidic and similar to that of a lime.
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. <i>Microcitrus australasica</i> , var. <i>sanguinea</i> . First fruit not red in Florida. Seem to be shy bearer.
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. This off-type finger lime was first
Australian Finger Lime 697 CGIP-233	6/21/2017	Has a red pulp that could be desirable
Sydney Hyb US	4/25/1983	Received one potted plant from Drs. Hutchison and Barrett, USDA, Orlando 4/25/1983 for planting in the arboretum. Seedling line from this introduction. <i>Microcitrus</i> hybrid. Origin: Australia, hybrid of round lime and finger lime, sent to Washington D.C.

Florida Citrus Budwood Program, Florida Department of Agriculture and Consumer Services



Sydney hybrid, *M. virgata*, CRC 1485
Microcitrus australis × *M. australasica*

<https://www.briteleaf.com>

<https://citrusindustry.net/2020/07/29/growing-finger-limes-in-florida-lessons-learned-so-far>



DPI-205-5 "Giant finger lime" hybrid or somaclonal variation



DPI-50-36 "Red finger lime" = CRC 1484

<https://www.briteleaf.com>



DPI-205-1

Finger lime propagations from Florida budwood reports 2013 to 2021

<https://www.fdacs.gov/Agriculture-Industry/Pests-and-Diseases/Plant-Pests-and-Diseases/Citrus-Health-Response-Program/Citrus-Budwood-Program>
 (Report not currently posted for 2014-15; no finger lime propagations listed for 2015-16)

Cultivar	2013-14	2016-17	2017-18	2018-19	2019-20	2020-21	Total 2013-21
Giant finger lime DPI-205-4	345	355	12605	567	1021	3949	18842
Red finger lime DPI-50-36	250	783	426	441	522	8559	10981
Finger lime DPI-205-1		478	130	1272	30	9974	11884
Minnie finger lime hybrid					24		24
Sydney finger lime hybrid						180	180
Australian finger lime 697 CGIP-233						200	200
Total per cultivar	595	1616	13161	2280	1597	22862	42111

Many of these trees have of course been sold at retail to dooryard growers.

Brite Leaf Citrus Nursery

- Anna and Nate Jameson
- Lake Panasoffkee, FL, in Sumter County, northwest of Orlando
- Nursery, sells trees, not fruit; started selling finger lime trees ~2007
- Offers Red finger lime (DPI-50-36) and “regular” finger lime (DPI-205-1); discontinued Giant finger lime (DPI-205-5).
- Brought in ‘Green Sapphire’, ‘Little Ruby’, ‘Rainforest Pearl’, and ‘Byron Sunrise’ from Eyles Citrus (near Sydney), now in cleanup, should be out this year.
- Thinks brightly color varieties will become most popular as they become available.
- Rootstocks predominantly ‘X-639’, ‘Kuharski’, and ‘US-897’; trees on Volk don’t look good so far; ‘UFR-17’ a good coldhardy choice
- <https://www.briteleaf.com>



Nate Jameson
Owner



Anna Jameson
Owner

photos <https://www.briteleaf.com>



Harpke Family Farm

- Tamer and Claire Harpke, Maria Emerson
- Davie, FL, in Broward County, west of Fort Lauderdale
- Planted just under 300 finger lime trees in 2021
- Grows UFL selections 13-2, 13-8, 13-31, and 13-37, two of which are 'SunLime' and 'RedLime'.
- Rootstocks: 'UFR-5' (mandarin/pummelo/sweet orange/trifoliolate); 'UFR-6' (mandarin/trifoliolate); 'UFR-17' (mandarin/pummelo/sour orange/citrange)
- Season: not clear yet
- Pest challenge: Diaprepes root weevil
- Intends to sell: at first mostly local, direct marketing, farm to chef, then wholesale to specialty produce marketers



photos Tamer Harpke >

Subdus Citrus

- Lillian and Frank Brunacci, he's a chef, they import truffles
- Deland, FL, Volusia County, 34 miles north of Orlando
- Planted first finger limes Apr. 2018
- Grows 150 trees, plus 75 in nursery: DPI-205-1, and DPI-50-36
- Rootstock: X-639
- Spacing: 18 x 10
- Season: late Aug-Nov. so far
- Sells at a small farmers market in Deland, and will sell to restaurants
- Challenges: hand weeding; trees very thorny



photos by Lillian and Frank Brunacci >

'Minnie'

- Finger lime hybrid that grows well in pots and fields and produces abundantly on very compact trees.
- **Origin:** USDA-ARS, Ft. Pierce, FL, by K.D. Bowman, G. McCollum, and A. Plotto. *Microcitrus australasica* × *Microcitrus inodora* (clone 80-527A); crossed 1997 at A.H. Whitmore Foundation Farm, Groveland, FL; tested as BS97-R4-15 and US-1936; released 2018.
- **Fruit:** mature fruit 50-100 × 15-30 mm; cylindrical, elongated ellipsoid to slightly fusiform, showing a blunt protuberance on both ends, with the blossom-end protuberance becoming more obtuse to acuminate as fruit matures and after harvest; rind thickness 0.95-1.5 mm, shows numerous visible oil glands; immature fruit dark green with smooth skin, changing to light green and then yellow with semismooth skin at maturity; locules per fruit 6-7; pulp vesicles pale yellow to pale green, long-stalked, ovoid to pyriform, averaging 7 × 3 mm and loosely cohering, and end in a very blunt or rounded tip; fruit taste sour, similar to common finger lime; texture crunchy, juicy; <1 developed seed per 50 fruit, and seeds are 4 × 4 mm and 16 mg each.
- **Tree:** small, compact and attractive; leaves dimorphic, as described for *M. australasica*, and most other morphological features are similar to those described for that species; young shoots and leaves reddish purple, becoming green or dark green when mature.

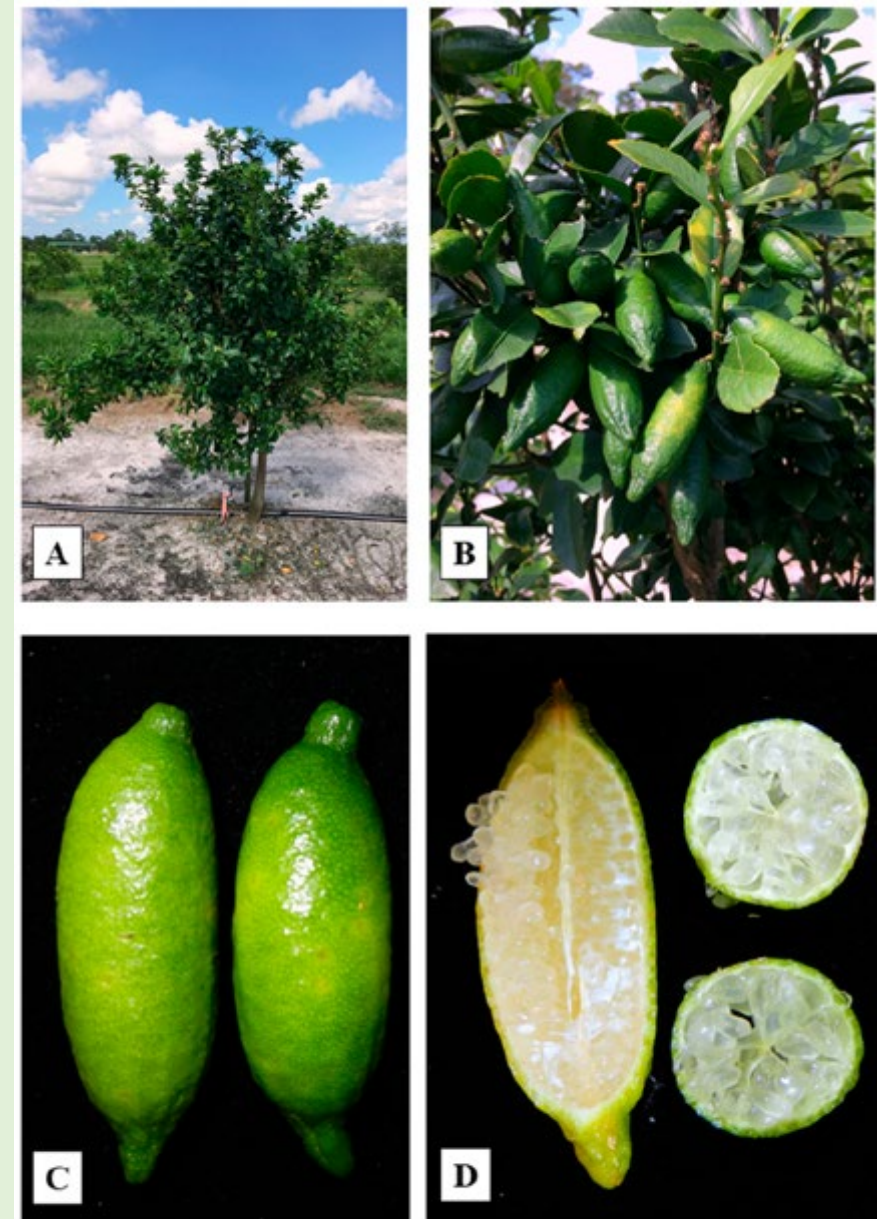


Fig. 1. Tree and fruit traits of 'Minnie Finger Lime'. (A) Three-year-old tree of 'Minnie Finger Lime', growing on Volkamer rootstock in Ft. Pierce, FL. The tree is 2.1 m tall and had 642 fruit (mostly still green) on 18 June 2018. (B) Fruit on field tree. (C) Close-up of two fruit harvested Aug. 2018. (D) Fruit interior in longitudinal orientation and as a cross-section.

'Rainforest Pearl' finger lime

- Erika Birmingham, Byron Bay Native Produce
- Finger lime o.p. growing in breeder's property in Bangalow, NSW, selected through two generations of open-pollinated seed; tree vigor strong, growth habit open, upright, very thorny; leaf obovate to elliptic, margin crenate, apex emarginate, glossiness of upper surface strong, glossiness of lower surface medium, size of oil glands medium, density of oil glands medium; fruit cylindrical to fusiform, tapering narrowly and gradually at each end, length 74.61 mm, width 17.85 mm, 18.5 g; rind yellow-green to red, thin; flesh pink, vesicles small to medium, flavor tart; seeds 16; ripens early, Dec.-Apr. in Bangalow.
- Australian PBR application 1997017; 1/15/97
- PBR grant 2274; 7/1/03
- PBR expiration 1/1/28

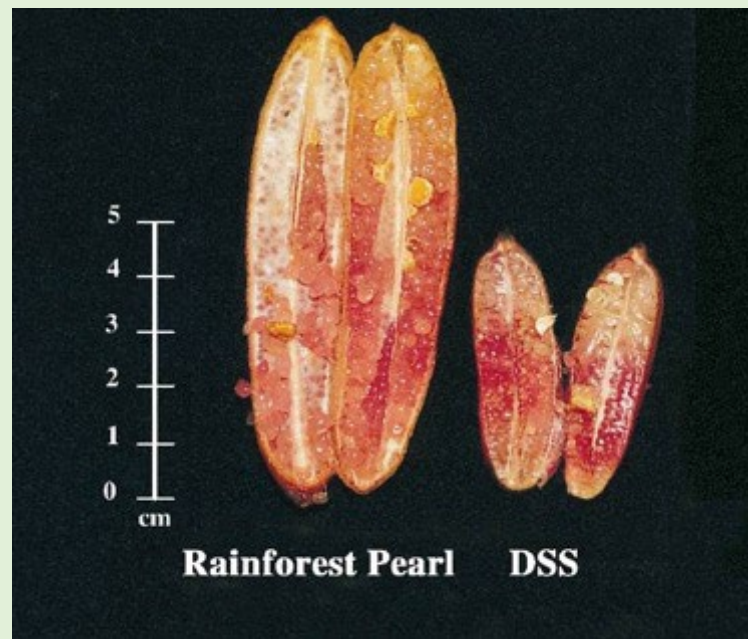
information in this section extracted from:

Karp, D. 2022. Modern Citrus Cultivars Descriptive Database

<https://citrusvariety.ucr.edu/MCCDD.html>



<https://boutiquecitrus.com.au/product/rainforest-pearl>



Australian PBR photo

'Red Phanter' finger lime

- Breeders: Orts Perez, Santiago Francisco; Botanica de Los Sentidos S.L, Spain (linked with Huerto Gourmet)
- CPVO PBR application 20173179; 12/4/17
- First applied as 'Macrocarpa', name rejected/withdrawn; reapplied as 'Red Phanter'
- application pending
- <https://www.huertogourmet.com>
- low in acidity

TARRINA (50 gr.) FINGERLIME COLOR

ROJO

Producto envasado en fresco obtenido directamente a partir del "finger lime", un pequeño fruto muy aromático que contiene en su interior unas vesículas esféricas con jugo cítrico de acidez baja. Es ideal para cócteles, pescados y mariscos más suaves.

Disponible en Huerto Gourmet todo el año



Variety Data Sheet			
Register			
Country	QZ - European Union	Type	Plant Breeders' Rights (PBR)
Name	Official Publication of the Community Plant Variety Office		
Organization	Community Plant Variety Office		
Web site	www.cpvo.europa.eu		
Species			
Principal botanical name	Citrus australasica F. Muell.		
Code	CITRU_AUS	Class	CITRU
Registration status			
Variety Status	Application		
Application			
Number	20173179	Breeder's Reference	macrocarpa
Date	04/12/2017	Publication Date	15/02/2018
Grant/registration			
Number		Date	
Publication Date		Renewal Date	
Expiration			
Expiration actual		Future expiration date	
Parties			
Breeder's Name	Botánica de Los Sentidos S.L.		
Applicant	Botánica de Los Sentidos S.L.		
Maintainer			
Holder			
Other parties	J & A Garrigues S.L.P. (Alicante Office)		
Names			
Denomination(s)			
Denomination	Red Phanter	Type	Fancy
Status	Published	Proposal Date	09/04/2019
Approval Date		Publication Date	15/06/2019
		End Date	
Denomination	Macrocarpa	Type	Fancy
Status	Rejected/Withdrawn	Proposal Date	04/12/2017
Approval Date		Publication Date	15/02/2018
		End Date	09/04/2019

'Australian Blood' ('Australian Red Centre')

finger lime hybrid: *Citrus limonia* x *Microcitrus australasica*

- Breeder: Steve R. Sykes, CSIRO, Australia
- Rangpur lime x red-fleshed finger lime, selected 1990; tree vigor strong, growth habit drooping; fruit small, length 30-50 mm, diameter 20-30 mm, ovoid to ellipsoid; rind red to red-orange to burgundy, smooth to pebbled; number of segments 5-9; flesh orange-red to red, juiciness medium to high, acidity high to very high; seeds 1-9, monoembryonic; ripens midseason, June-July in Australia.
- Australian PBR application 1996277; 12/11/96
- PBR grant: 2443; 3/30/04
- PBR expiration 3/30/29



<http://www.marvicknativefarms.com.au/australian-native-citrus>



<https://www.freshplaza.com/article/176999/AU-Increased-exposure-for-the-Australian-Blood-lime>

'Australian Sunrise' finger lime hybrid

Microcitrus australasica x (*Fortunella* sp. x *Citrus madurensis*)

- Breeder: Steve R. Sykes, CSIRO, Australia
- Faustrimedina [finger lime x calamondin] O.P., selected 1990 in Merbein, VIC; tree vigor strong, growth habit upright, canopy density medium; days from flowering to fruit 180; fruit pyriform, small, length 30-45 mm, width 20-40 mm; rind orange, smooth, thin; segments 5-9; flesh orange, soft, acidity high; seeds 5-9, monoembryonic; makes an excellent marmalade.
- Australian PBR application 1996276; 12/11/96
- PBR grant 2442; 3/30/04
- PBR expiration 3/30/29



<http://www.marvicknativefarms.com.au/australian-native-citrus>

‘Red Caviar’ finger lime × mandarin hybrid

- *Microcitrus australasica* × *Citrus reticulata*
- Breeder / applicant: Laurent Boughaba, Montrouge, France, a suburb just south of Paris. Mr. Boughaba owns a market there called [L’Agrumiste](https://www.lagrumiste.com), and a citrus orchard of ~100 ha near Fez, Morocco, with some 250 citrus varieties. He specializes in growing specialty citrus and in selling to chefs. He says that he has created “a Research and Development program, in partnership with French National Agronomic Research Institute, to create tomorrow’s citrus and tastes.”
- But it may be that this cultivar was actually bred by Michel and Bénédicte Bachès, Pépinières Bachès, Eus, France. When I visited in early January 2019, Michel showed me this cultivar, and let me taste it, but would not let me photograph it. They mentioned that the rights had been sold to a Moroccan grower for commercialization. I believe it was a cross of finger lime × mandarin that had been backcrossed to mandarin; it was sweet and delicious.
- CPVO PBR application 20210344; 2/1/21
- Originally applied as “Citron Caviar Red Lemon”
- <https://www.lagrumiste.com>



<https://www.lagrumiste.com>

'UF SunLime' finger lime hybrid

- Manjul Dutt, University of Florida, Lake Alfred
- USPP application 17/300,785; 11/5/21
- Hybrid between an open pollinated *Citrus inodora* (clone 80-527A) seedling and *Citrus australasica* var. *sanguinea* DPI 50-36; introd. 2021.
- Tree moderately vigorous, with dimorphic unifoliate leaves.
- Fruit cylindrical, length 3 in.; skin deep red and flesh moderately red, both pigmented with anthocyanins; blooms and fruits year-round in Homestead, FL.



'UF RedLime' finger lime

- Manjul Dutt, University of Florida, Lake Alfred
- USPP application 17/300,783; 11/5/21
- Origin: Hybrid of two selections of red finger lime (*Citrus australasica* var. *sanguinea* × *Citrus australasica* var. *sanguinea*); introd. 2021.
- Fruit: cylindrical, elongated, ellipsoid to slightly fusiform, tapering at both ends; length 106.65 mm.
- Tree small.



<https://mobile.twitter.com/UFTropical/status/1499793470331895810>



Perspectives

- We're at the beginning stages of improvement of a crop that was only recently domesticated. New and newly introduced cultivars with a range of skin and pulp colors and flavors are likely to be more attractive to farmers and consumers.
- Near term many growers will plant finger limes for their HLB resistance, which may overwhelm the limited market demand for this niche crop.
- If Florida production takes off and is of high quality, California growers who don't have local outlets (farmers markets, farm stand, CSA) may face tough competition.
- Keep in mind the seed problem if planting multiple cultivars.
- Investigate the use of Apeel or other shelf-life extenders.
- To extend the market, consider producing jars of "finger lime pearls" extracted from the fruit.
- Either one grower with deep pockets, or a group should spend the money to promote this new crop and bring it to public attention. You may need to pay slotting fees.
- If needed, get a PRA going for your area to expand export opportunities.



'Sunshine Yellow'

Thanks to Tracy Kahn, Toni Siebert-Wooldridge,
Karene Trunelle, and the team at UCR!
David Karp • dkarp@ucr.edu