



Florida Olives 2021

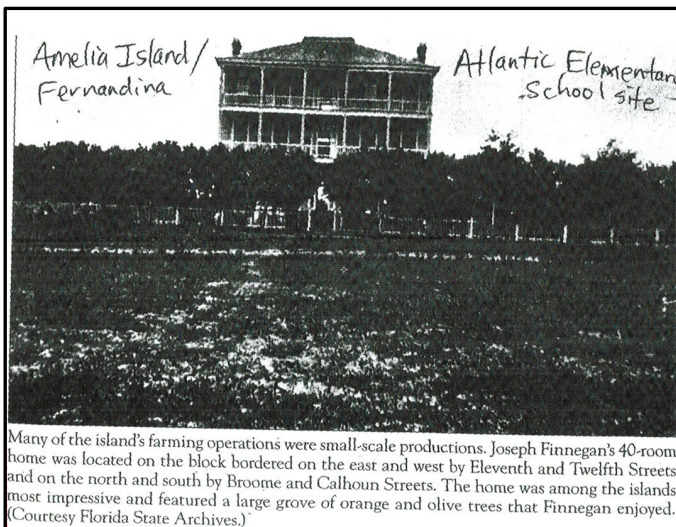
General Cultivation and Production Information

Disclaimer: The cost estimates and much of the narrative below is based on research done by the University of California at Davis <<https://olivecenter.ucdavis.edu>> in 2009. While the production and cost data are generally correct considering the time period, Florida and California have different infrastructure, soils and climate. In that regard, any generalizations as to costs or production, based on the data herein, must be heavily caveated to reflect those differences.

Who We Are: The Florida Olive Council, LAA is a non-profit organization (501c3) in partnership with private and public organizations conducting olive research since 2010. Some discussion herein reflects that research. Reports are available on the Council website <<http://www.floridaolive.org>>



Blooming Olive Tree - St. Augustine



History: Olives have been cultivated in Florida for over 300 years. In 1565, Spanish missionaries planted olives in St. Augustine; Mediterranean Minorcan settlers planted olives at Dr. Turnbull's New Smyrna plantation (near Daytona Beach) in the 1750s; J.K. Stickney, an early publisher of the Jacksonville Times Union newspaper and Joseph Finnegan, a local farmer grew olives in Fernandina in 1864 (left); and a 1920's federal government report talks of a "35 foot bearing olive tree" on the Gibson farm near Tampa.

Today: Currently (2020) there are approximately 800 acres of olives under cultivation in 26 of Florida's 67 counties. The groves range from back-yard hobby groves to 20+ acre commercial operations. Several Florida nurseries sell olive trees for fruit production and ornamental purposes. While this diversity of Florida olive plantings is encouraging and recent successes with olives in South Georgia are of note; more hard science is warranted before Florida olive cultivation can achieve significant economic scale. The Council, UF-IFAS and other partners are committed to fully exploring the potential for an olive industry in Florida.

How to Begin

Fundamentals: Like citrus, olives need full sun and well-drained soils. Olive grove size and configuration may vary depending on the grower's geographical location, environmental conditions, desired crop and method of harvest. In the narrative below, UC-Davis scientists developed estimates for a *medium-density* olive grove (269 trees per acre). These estimates are based on California soil and climate – *not* Florida's so it is wise to approach Florida commercial olive cultivation with caution.

Location: With Florida's sun and well-drained soils olives generally do well, but the currently available commercial varieties native to the northern Mediterranean (Spain, Italy, Greece) referred to herein as *NoMed* varieties, do not produce consistently below the I-4 corridor. That said, there are several areas in Florida proven to be acceptable for olive production using currently available NoMed varieties; these are primarily located in the north and northwest (Panhandle). Good site selection and grove design are keys to success.

Grove Design Considerations for Florida



Heavy Bloom on Koroneiki April 2021

The olive is a desert plant. It can live through terrible droughts but if olive roots are saturated with standing water, the tree will die. Planting on high-dry ground is essential. If you plant trees shaded by taller trees or a structure, the olives will not do well.

In addition, grove-density decisions must consider Florida's generally higher humidity and summer rainfall - two conditions that usually don't exist in other olive growing regions. High humidity and rainfall during blooming can inhibit pollination and negatively impact fruit-set.

That said, some olive varieties in Florida bloom and begin to set fruit in April-May, well in advance of traditional summer storms. We recommend reading the [UC-Davis guide](#) for more fundamental information on olive grove planning.

Pollination: While some olive varieties are self-pollinating other varieties are not and require the addition of "pollinator" trees strategically placed in the grove. Since olives are generally wind pollinated, grove layout should consider varieties and wind direction during blooming (March-April) by arranging pollinator trees upwind of main producer trees.

Blooming: Some olive varieties may present a snowy cluster of blossoms covering the tree, but olives generally set fruit on less than 5% of the blossoms. It is important to maximize bloom

and fruit set using appropriate densities, pruning methods and nutrition. Pruning is critical. Insufficient wind and light penetration into the tree have a detrimental impact on yield.



High Density Spacing

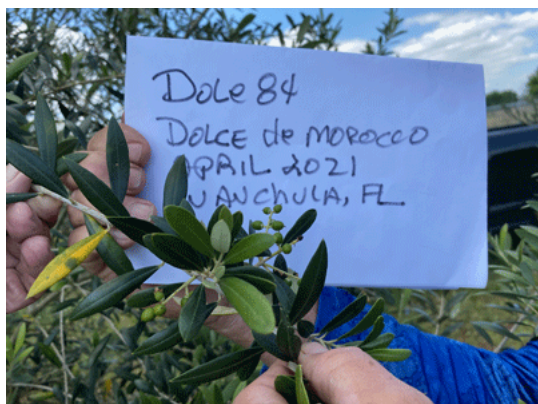
Design: The UC-Davis model for *medium density* is planted on 9' X 18' spacing. That is nine feet *between trees* and eighteen feet *between rows*. In this configuration, with room to grow and considering good maintenance, olive trees can have a 40+ year production life.

Groves with higher densities may require thinning or replanting after 10-15 years. Higher density groves may be on 5'-6' centers and 12'-18' rows. Wider spacing is suggested in regions with higher humidity or where organic cultivation methods preclude use of certain chemicals.

Tree Spacing: Tree spacing is driven by many factors but there is some agreement amongst Florida and Georgia *high-density* growers that a spacing of at least 6 feet between trees is desirable. Again, grove design is a consideration that may impact profitability. A low-density grove, 60-80 trees per acre, might have a 20'-25' foot spacing to facilitate use of large mowers but have lower yield; whereas a high density grove with narrow spacing for production efficiencies using overhead harvesters will yield more but may require use of more chemicals to suppress weed growth and fungus development due to close proximity of trees. Clear-eyed planning is essential.



Low Density Spacing



Morocco Variety in Wauchula 2021

Winter Chill

In order to bloom and fruit, olives must go into an un-interrupted dormancy (vernalization) period during winter (November – March). This vernalization is dependent on the olive tree accumulating sufficient chill hours.¹

Most NoMed varieties are not commercially productive using current cultivation practices, south of 28° N. Latitude. Some 3+ year-old grafted trees from the Middle East and North Africa produced fruit at the Wauchula olive research center (27° N) in 2021. While this result is encouraging, and genetic research

¹ Chill Hour = 1 hour with temperatures between 32° and 45° F. (0° - 7.2° C.)

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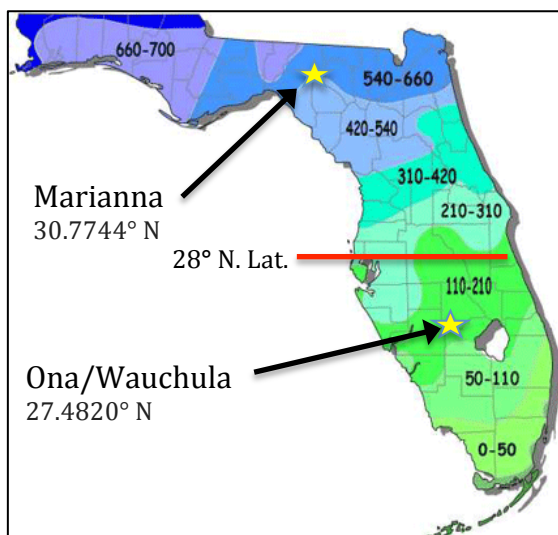
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at UF-IFAS holds promise; work has only begun on developing a low-chill cultivar for Florida.

Variety Selection: Most of the olive varieties available in Florida today are native to the northern Mediterranean (Spain, Italy, Greece @ 38° - 41° N) and propagated by nurseries in northern California (38° N.). These NoMed varieties often require accumulation of 250-300 hours of chill to bloom. Blooming generally takes place on mature (3+ year old) trees; some varieties may take 4-6 years to fruit in commercial quantities and require 400-500 chill hours.

While Koroneiki and Arbequina, smaller oil varieties, grow well in most areas of Florida; they produce most reliably in northern Florida where annual chill is at least 300 hours. Ascolona, Leccino, Mission, Manzanilla and larger “table” varieties seem to produce well only in the



Florida Chill Map

Panhandle area where annual chill is in excess of 400 hours. [UF-IFAS Extension Service](#) provides agriculture-oriented weather information, including chill, for many areas of Florida.

Nursery Stock: It is imperative to select only “true-to-type” nursery stock from an established, certified grower. Currently, Florida is generally free from olive knot, olive fly and other pests common to olive growing regions. However, unregulated importation of trees can introduce these pests to Florida.

CAUTION: Never buy olive trees acquired from outside the State with fruit on them.

The [California Olive Oil Council](#) is a good source for reliable suppliers of certified, true-to-type olive nursery stock. Both *Arbequina* and *Koroneiki*, two

varieties popular with high-density Florida growers appear to produce fairly well above 28° latitude if sufficient chill is achieved. *Koroneiki*, *Chemlali* and *Oliana*® flowered at St. Augustine (2021). In a recent experiment, *Chiquitita*, *Koroneiki* and *Arbequina* bloomed in Wauchula (2021) albeit with less vigor than in northern Florida.

Depending on variety and quantity purchased, nursery stock may cost \$3.00 – \$6.00 per tree plus shipping. Most California wholesale nurseries discourage small quantity orders. Some Florida nurseries selling olives include: [Florida Olive Systems](#), [Florida Olive Group](#), [Sun City Tree Farm](#), [Olive Tree Growers](#) and [Quality Green Specialists](#). Home Depot and Lowes have small olive trees from time to time – variety unknown.

The Bottom Line: Know that chilling is one of the most controversial issues in the Florida olive discussion. A recent inventory of active Florida olive plantations suggests there are several small Florida groves in the 210-310 chill hour zones and a few backyard hobby plots further south (Ona, FL); but significantly more groves are planted in regions above 28° N. latitude.

The oldest continually producing olive grove in Florida (20+ yrs.) is located near Marianna, a 660-700 annual chill hour region. Contact your local [UF-IFAS Extension agent](#) for more information about weather and olive resources in your area.

General Maintenance and Harvest

After grove installation, there are on-going expenses to be considered. These expenses include irrigation, pruning, fertilization, pest control, harvesting, processing and other steps depending on whether production is focused on olive oil or table olive or if the producer is also the bottler and/or packer/retailer. Olives are alternate-bearing having "ON" and "OFF" years. This factor will impact pruning schedules and other cultivation and harvesting operations. Specific major elements of cost are discussed below.

Pruning

Depending on the quality and age of the nursery stock and the desired grove configuration, young trees should generally be pruned once per year up to the age of three (3) creating an 18"- 24" clear trunk at bottom of the tree to facilitate cultivation, enhance airflow and allow irrigation equipment maintenance.

Considering a *medium density* grove, where individual trees will be harvested, in year five (5) or when the trees reach greater than 6' wide, the central leader is sawed out. In years six (6) to nine (9), one or two internal branches are removed each year to gradually form an open vase shape with 3 to 4 main scaffold branches.

Normal pruning is conducted in April in California on trees that have a heavy bloom ("ON" year) and are expected to have a heavy crop by keeping the centers open and thinning out tall upright branches to an outward facing lateral. Photo above is 50+ year-old olive tree near Episkopi, Crete pruned to facilitate hand harvest.



Heavily Pruned Old Olive - Crete



Multi-Arm Pruner

Pruning by hand labor is assumed at 36 hours per acre for experienced fieldworkers. Commercial *high-density* groves often use mechanical pruners. In *medium-density* groves, maximum tree height is kept at 14 feet.

In high-density groves, where well-formed hedgerows are encouraged, pruning occurs at a height accommodated by the overhead harvester. Little pruning is conducted on "OFF" year trees; consequently average pruning over two years is 18 hours per acre per year for *medium-density*. Hand pruning, although labor intensive, is the best method to clear growth in the interior of the tree. Providing light and ventilation is critical for yield.

Fertilization

Mature trees receive more nitrogen (N) in “ON” years with heavy bloom and heavy crop set (100 lbs. of actual N per acre) and much less (40 lbs. of actual N per acre) in years with light bloom and low crop load (average 70 lbs. per acre per year). The fertilizer (non-organic operations) is generally applied through drip irrigation from March through October.

Strategic applications of Potash (K) have been reported to significantly increase yield and copper is also applied after pruning to avoid disease. Some Florida organic growers have reported well-leached horse manure mixed with stable straw either incorporated prior to planting or applied post-planting as a mulch has offered very good results. Appropriate plant nutrition is a function of many factors including, but not limited to, soil composition, pH, tree spacing and unique demands of various cultivars. There is no hard and fast rule for fertilization/cultivation of olives in Florida.

Pest Management

Little is known about pests affecting olive trees in Florida. There are reports of various insects (e.g., glassy-winged sharpshooters, Asian stink bugs, etc.) attacking the trees from time to time but Florida growers do not report significant pest damage, **so far**. See UF-IFAS publication: [Pests and Fungal Organisms Identified on Olives \(*Olea europaea*\) in Florida](#).

Olive Fruit Fly: Currently, the Olive Fruit Fly is not found in Florida. This pest is expensive to control. In some areas of California regular control of the olive fruit fly involves McPhail pheromone traps and Spinosad (GF-120) bait sprayed twice per month to alternate rows from June/July thru November. A post harvest treatment is made to all rows in late November or early December to reduce overwintering fly populations - for a total of nine applications. The fly has not been seen in Florida but beware – importing *fruiting* olive trees can encourage Olive Fly infestation resulting in significant costs.



Florida Stink Bug

Black Scale: Black scale is occasionally a concern to olive growers, but specific control measures on Florida olives are not well understood. Pruning will control the black scale insect in most years. Following cool years or in orchards with dense foliage, an insecticide treatment may be required to reduce the population to manageable levels.



Black Scale

Fungus: The fungal disease *peacock spot* and the bacterial disease *olive knot* usually require two copper sprays in rainy coastal areas. Kocide (copper) is applied based on need. While these pests are not a large problem in Florida; careful observation and immediate treatment is prudent.

Weed Control

Weeds in mature *non-organically* cultivated orchards are controlled using a combination of herbicides and mowing. Weeds within the tree rows are controlled with a mixture of residual pre-emergent herbicides (Goal, Surflan) and a contact herbicide (Roundup) in the fall or winter.

Young trees are susceptible to damage from glyphosates. Some Florida and Georgia growers use plastic weed block. Specialized machinery (left) can be used depending on planting scheme.



Manual Weed Control

Vertebrates

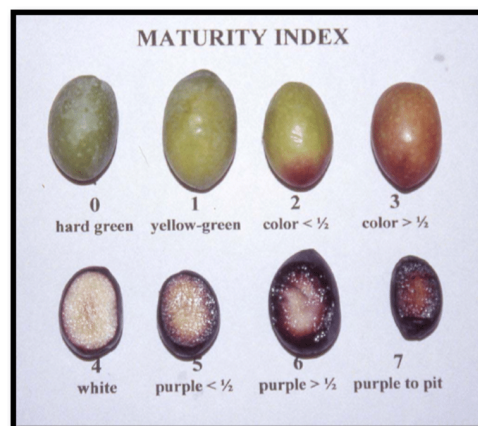
Rodents are controlled through baiting and squirrels are not a problem as the olive fruit is bitter. Deer do not eat olives but can cause damage by nibbling new growth. Trunk damage during deer rutting season can be a problem. A high fence generally controls deer. Birds do not generally present a problem.

Harvest

While some production may occur in the third year, and may or may not be harvested, the first significant harvest begins in the fourth year. Costs for contracted harvest operations and are generally \$500 per ton. Custom harvest costs can be higher depending on size of the orchard, density and topography. Olives in most small and mid-sized groves are harvested by knocking, shaking, or raking fruit into nets for collection and subsequently emptied into field hampers. Overhead harvesters are used for large commercial high-density groves.

Fruit is picked at the color change (*veraison*) stage of yellow-green to red-purple skin color with white-green flesh, usually in late autumn. However, early fruit maturation has been noted in north central Florida with crop ready in early September. Handling of the fruit is

critical. Care is taken when harvesting so that the skin of the fruit is not broken nor the flesh excessively bruised, especially for table olives. Harvested olives are transported from the field directly to the mill for immediate processing.



Overhead Harvester

Yield

Medium-density planted olives begin bearing an economic crop in the fourth year after planting and maximum yield is reached in the ninth to tenth year. (Note: consistent yield is difficult to maintain in olive orchards due to normal alternate bearing and occasional detrimental weather that reduces fruit set.)

Olives can yield 21% oil per fresh weight (7.61 pounds per gallon). Typical annual yields for olives are measured in tons per acre (3-4T/acre average for SHD) and roughly equivalent to 40 gallons of oil per ton. Many cultivars used for olive oil (Arbequina, Arbosona, Koroneiki) will produce 30 to 50 gallons of oil per ton. Private bottlers of artisanal oil get \$30-45 per gallon.

Processing

In California, the cost to process fruit varies from mill to mill and can range from \$250 to \$475 per ton. There are no large milling operations in Florida. Shaw Brothers Olive grove in Lakeland, GA (near Valdosta) has a 1.5 ton olive mill and bottling operation. Several Florida growers have small custom mills some using garbage disposals and hydraulic jacks.



20 Ton/Hour Olive Mill

All processing must be conducted under sanitary conditions. Fresh fruit from the field must be cleaned and washed before crushing, malaxation and oil extraction. Most modern olive mills use a “decanter” which separates the oil from the pulp using centrifugal force. A high standard of cleanliness is required due to the sensitivity of the oil rendering process.



1/4 Ton/Hour Olive Mill



Don Mueller's Home Built Mill

Excessive impurities in the final product add costs therefore crop washing, leaf and debris removal and olive waste processing considerations are important for quality and environmental sanitation. These factors can drive additional costs. Olive mill costs range from several million for large mills to under \$50K for smaller models. “Home” mills can be made from commercial grade garbage disposals (grinding olives – pits and all) and hydraulic jacks (pressing).

Bottling and Packaging

The average cost to take the oil from bulk storage to a finished product ready for retail sale can vary considerably. Bottling equipment and associated labor costs include bulk oil storage, oil transport, storage of cased bottles, washing, filling, labeling and packing. While 375 ml is a standard retail size, the increased use of olive oil for cooking is driving larger packaging (3 liter), and in some stores, bulk sale. These retail trends may significantly improve delivered cost per unit in the future particularly for oil sold into a local market. In most areas, large growers sell their crop to an olive mill based on pre-harvest yield analysis.

Summary

Olive trees grow and thrive in Florida, particularly north and northwest Florida. The biggest question facing farmers is the ability of an olive variety to bear fruit year-over-year in a particular area of Florida. All that remains is to conduct the research by planting, observing and documenting various olive varieties and cultivation practices in Florida. The Florida Olive Council, LAA seeks partners to promote and fund olive research in Florida. Please go to our website www.floridaolive.org and become a member/donor. Thank You.

Michael O'Hara Garcia, President michael@floridaolive.org (202) 246-2001