Introduction to Olive Growing
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Presentation Outline

- Production Innovations
- Growing Systems \{MD and HD SYSTEMS\}
- Marketing Demand & Profitability
- Soil, Climate, Water, Varieties
- Making a profit – Understanding quality

September 9th

- How to grow details & pest control
Two 1° reasons for interest in olive oil

Mechanization & Health
Why Olive Oil?

- Lower grade soils
- Easy to grow
- Few pests
- Low water use
- Lower quality water

- Mechanized
- Healthy - tastes good
- Big market
- Vertical integration
- Sales all year
Why Olive Oil – NOT?

- Large investment
- Slow to full bearing
- Small profit margin
- Lots of competition
- Expensive harvest
- Ignorant consumers
- Small scale profit is in direct sales only
Olive Oil Production Innovations

GROWING OLIVES
• Mechanical harvest
• Low vigor varieties
• Drip irrigation
• Mechanical pruning

PROCESSING FRUIT
• Cont. flow system
• Electricity (pumps, motors, temp. control)
• Stainless steel
1:1 ratio

$400/ton
Harvesting olives with air powered combs

1:1.8 ratio

$222/ton

Harvesting olives with air powered combs
1:2.6 ratio
$160/ton
Shaker harvest

1:3.2 ratio

$120/ton
Trunk shaker and inverted umbrella wrap around
California Prune Harvester
Medium density spacing = 12 – 20 ft apart = 100 – 300 trees/acre
Over-the-row harvest $ 42 per ton @ 5 tons/acre
High density spacing = 4 x 12 to 5 x 13
670-900+ trees/acre
Modern Continuous Flow System
Producing Extra Virgin Olive Oil

Simple as 1-2-3-4-5

1. **Good Fruit** – no rot – not frozen
2. **Handled carefully** – no damage – short storage
3. **Processed quickly** – in modern clean equipment
4. **Stored well** – clean stainless steel - purged
5. **Sold** – within a year or less
Leaf and stem removal
Horizontal Decanter

- Injection volume
- Separation ports
- Brand
- 2 or 3-phase
Vertical Centrifuge

- Cleans oil of water and solids
- Cleans wastewater of oil
- Water added to increase interface
- **Volume and Temperature**

Taste every batch
Continuous Flow System
WORLD OLIVE OIL STATISTICS
World Olive Oil Production

Total World Production: ~2.2 million metric t/yr

IOOC Data 1997-2002

Libya, Egypt, Israel, Jordan, Lebanon, Yugoslavia, Croatia, France, USA, Mexico, Argentina, Chile, Brazil, Peru, South Africa, China, New Zealand, Australia
## Olive Oil Consumption 2006

### World PER CAPITA (liters)

<table>
<thead>
<tr>
<th>Position</th>
<th>Country</th>
<th>Consumption</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Greece</td>
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<tr>
<td>2.</td>
<td>Italy</td>
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</tr>
<tr>
<td>3.</td>
<td>Spain</td>
<td>13.9</td>
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<tr>
<td>4.</td>
<td>Cyprus</td>
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<tr>
<td>5.</td>
<td>Portugal</td>
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<tr>
<td>6.</td>
<td>Syria</td>
<td>5.1</td>
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<td>7.</td>
<td>Tunisia</td>
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<tr>
<td>8.</td>
<td>Palestine</td>
<td>3.5</td>
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<tr>
<td>9.</td>
<td>Jordan</td>
<td>3.1</td>
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<tr>
<td>10.</td>
<td>Israel</td>
<td>2.6</td>
</tr>
<tr>
<td>11.</td>
<td>Morocco</td>
<td>1.8</td>
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<tr>
<td>12.</td>
<td>Luxemborg</td>
<td>1.7</td>
</tr>
<tr>
<td>13.</td>
<td>France</td>
<td>1.6</td>
</tr>
<tr>
<td>14.</td>
<td>Libya</td>
<td>1.6</td>
</tr>
<tr>
<td>15.</td>
<td>Australia</td>
<td>1.6</td>
</tr>
<tr>
<td>16.</td>
<td>Algeria</td>
<td>1.4</td>
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<tr>
<td>17.</td>
<td>Lebanon</td>
<td>1.3</td>
</tr>
<tr>
<td>18.</td>
<td>Belgium</td>
<td>1.2</td>
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<tr>
<td>19.</td>
<td>Croatia</td>
<td>1.1</td>
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<tr>
<td>20.</td>
<td>UK</td>
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</tr>
<tr>
<td>21.</td>
<td>Netherlands</td>
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<tr>
<td>22.</td>
<td>Canada</td>
<td>0.8</td>
</tr>
<tr>
<td>23.</td>
<td>Turkey</td>
<td>0.7</td>
</tr>
<tr>
<td>24.</td>
<td>USA</td>
<td>0.7</td>
</tr>
</tbody>
</table>

### By Country

- Italy 30%
- Spain 20%
- Greece 9%
- **USA 8%**
- France 4%
- Syria 3%
- Other 26%

*Mercacei # 50 Feb-April 2007*
USA imports 99.3% of consumption
TO MEET CURRENT USA DEMAND for OLIVE OIL

We would have to grow 300,000 + acres of oil olives
@ 5 tons per acre yield
@ 40 gallons of oil per ton
= 757 liters per acre

How much might demand increase?
## 2004 - 08 California oil olive
### Growers & Acreage

<table>
<thead>
<tr>
<th>Region</th>
<th>Growers</th>
<th>Acres</th>
</tr>
</thead>
<tbody>
<tr>
<td>North Coast</td>
<td>268</td>
<td>1,535</td>
</tr>
<tr>
<td>Central Coast</td>
<td>59</td>
<td>376</td>
</tr>
<tr>
<td>S. Coast &amp; S. Cal.</td>
<td>17</td>
<td>70</td>
</tr>
<tr>
<td>Sacramento Valley</td>
<td>94</td>
<td>3,216</td>
</tr>
<tr>
<td>San Joaquin Valley</td>
<td>39</td>
<td>707</td>
</tr>
<tr>
<td>Sierra Foothills</td>
<td>51</td>
<td>264</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>528</strong></td>
<td><strong>6,168</strong></td>
</tr>
</tbody>
</table>

*(2005 to 2008) planted ~ 12,800 acres

*(660 growers ~ 20,000 acres* 

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*Paul Vossen*
USA Production:
• Lower land cost
• Abundant cheap water
• Low cost labor & housing
• Hotter – drier
• Higher yield

Central Valley
• Lower land cost
• Abundant cheap water
• Low cost labor & housing
• Hotter – drier
• Higher yield

Coastal California
• High cost land
• Limited expensive water
• High cost labor & housing
• Cooler – more moist
• Lower yields
• High quality “perception”
BASIC NUMBERS

- Establish = 3rd yr. SHD ~ $6,000 – MD ~ $3,000/acre
- Years to full production = 5-10
- Average yield = 3 to 5 t/acre = 120-225 g/acre
- Bulk price = $30-75/gallon
- Retail @ $20/½ liter bottle = $112-150/gallon
- SHD: cost $13 grow + $12 process/gallon ($25)
- MD: cost $35/gallon ($80/gallon with high land values)

Best scenario - $28,000/acre (w/o land value)
Average scenario - $13,000/acre (w/o land value)

http://coststudies.ucdavis.edu

(Direct sales): growing, harvest, processing & bulk storage (no bottling or marketing costs)
What Other Costs?

+ 40-55%

- Land (Capitol Recovery) – 13% to 25%
- Overhead – 4.7% to 5.5%
- Bottling (½ L) - 900-1,650 /acre – 6-7%
- Marketing – 17% to 18%

Potential Profit

$6-14,000/acre

with lots of work and risk

NO DISTRIBUTION
Revised Olive Production Manual
University of California # 3353

- Climate & Site Selection
- Botany – Cultivars
- Physiology
- Pruning
- Irrigation
- Nutrition
- Pests
- Harvest
Organic Olive Production Manual

This manual provides detailed information for growers on production issues, economics, pest control, the conversion process, and organic certification and registration.

Using this manual you’ll learn about orchard site selection considerations, irrigation needs, terrain, temperature, soil, damage from the olive fruit fly, and how these may vary for table fruit versus fruit for oil production. You’ll also learn how to evaluate harvest methods—an important consideration as harvest costs typically amount to half the total production cost for olives.

This manual has been developed as a supplement to the Olive Production Manual, 2nd Edition, (O353). Organic growers are advised to consult both publications as they develop and refine their production systems.

Also from the University of California, two companion publications for olive growers:

- Olive Production Manual
- IPM for Olive

60% Growers are Organic
Olive Oil Profitability Potential

**Positives**
- Big USA Market
- Competitive cost with mechanical harvest
- Mill Technology
- Excellent USA Quality
- High CA/USA Demand
- Low Import Quality
- Early Productivity
- Good Prices
- EU Subsidy decline

**Negatives**
- Cheap imports
- Must market Quality to US Consumers
- Unknowns of SHD System
Olive Production

$ Making Money $

• Must have basic resource
  – Land, water, climate, labor

• Must have competitive costs
  – Low labor rates
  – Mechanization

• Must have competitive yield
  – Minimum of alternate bearing

• Must produce excellent quality and sell it
  – Value to the consumer
Planting for trunk shaker

A. **Planting distance** ~ 18 to 24 ft. apart

B. **Training system**
   - Trees with one trunk, high 36-40 inches
   - Open canopy, 3-4 slanting branches
   - Rigid reach of fruiting branches.
   - Without pendulous branches.

D. **Soil slope** - Flat to about 20% slope (crawler tractors)

E. **Fruit size** - Large fruits are preferred.

F. **Fruit detachment** - Variety with low force

**Most varieties work OK**
Planting characteristic for trunk shaker

Application Point. Should be the trunk otherwise it takes too long.
Growing Olives

**Site** *(climate, terrain, soil, water,)*

**Varieties** *(table & oil)*

**Systems** *(high & super density)*

**Cultural Practices** *(organic & conventional)*

Give yourself every possible advantage
Best Olive Conditions

**Regional**
- Mild winters
- Dry summers
- No frost before bloom or harvest

**Local**
- Well drained soils
- Class 2-3 soils (not the “best” soils)
- Lack of perennial weed competition
- Limited exposure to high winds
- Able to control vigor (soil moisture)
Site Selection: Climate (Local)

- Consult with local growers and others regarding climate history
- If more info is needed, inexpensive temperature monitors can be used to determine local temperature patterns
- Look at CIMIS weather station data

http://wwwcimis.water.ca.gov/cimis/welcome.jsp
Damaging Climatic Conditions for Olives

- **Winter** – young trees < 25°F
- **Winter** – mature trees small branches < 22°F
- **Winter** – mature trees killed ~ <15°F
- **Autumn** – fruit before harvest < 29°F
- **Spring** – rain, high humidity, or hot dry wind at bloom
- **Summer** – cloudy

Lowest spot on valley floor is not the best
Site Selection: Climate

Ideal winter temps = (35°F to 65°F)

Avoid Areas with:

- Temperature below 22°F – kills wood
- Wet summers - disease
- Frost – temperature below 29°F before harvest – ruined fruit
- Cold/wet OR hot/dry at bloom
Oil Quality Factors

• Variety 40%
• Maturity 40%
• Processing 15%
• Growing Conditions 5%
  – Primarily irrigation
<table>
<thead>
<tr>
<th>ATTRIBUTE</th>
<th>Siurana</th>
<th>Garrigues</th>
<th>Andalucia</th>
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</thead>
<tbody>
<tr>
<td>Fruity</td>
<td>2.4</td>
<td>2.2</td>
<td>3.1</td>
</tr>
<tr>
<td>Green</td>
<td>1.5</td>
<td>1.4</td>
<td>1.8</td>
</tr>
<tr>
<td>Bitter</td>
<td>1.1</td>
<td>1.8</td>
<td>0.6</td>
</tr>
<tr>
<td>Pungent</td>
<td>1.6</td>
<td>1.7</td>
<td>0.6</td>
</tr>
<tr>
<td>Sweet</td>
<td>1.8</td>
<td>1.8</td>
<td>2.4</td>
</tr>
<tr>
<td>Sensory Rating (EU)</td>
<td>7.7</td>
<td>7.4</td>
<td>8.9</td>
</tr>
</tbody>
</table>

Tous, Romero, Plana, Guerrero, Díaz, & Hermoso. 1997
Site Selection: Soil

• Plant olives in good to decent soil, not “the best”.

• Good olive soil is:
  – well drained
  – moderately deep (3-4’) 1.5-2’ can work
  – moderate slope (drainage and harvester)
  – moderately coarse textured
  – Not high vigor conditions
Well Drained Gravely Soil
Use a backhoe to check for rooting depth and drainage

**MYTH:** olive trees need good soil and high organic matter
Shallow Roots
Irrigation Water Testing

- Gallons per minute (September)
- pH (acid/base)
- Sodium ($\text{Na}^+$)
- Chloride ($\text{Cl}^-$)
- Sodium Adsorption Ratio (SAR)
- Boron (B)
- Bicarbonate ($\text{HCO}_3^-$)
- Nitrate ($\text{NO}_3^-$)
Site Selection: Irrigation Water

• Olives need 1-2 acre feet/year \((325,000 \text{ – } 650,000 \text{ gallons})\) \(3-5 \text{ gpm/acre minimum}\)

Avoid water containing:

• High Boron \(> 2 \text{ ppm}\)
• Bicarbonate \(> 3.5 \text{ ppm}\)
• Total Salt \(> 3 \text{ dS/m EC - 480 ppm}\)
• High Sodium \(> 3 \text{ meq/l - 9 SAR}\)
• High Chloride \(> 345 \text{ ppm}\)
HOW MUCH WATER IS NEEDED TO GROW OLIVES by CLIMATE?

- **Young Trees** = 100% ET
  - (20” coastal – 40” interior)

- **Mature Oil Olives** = 45-55% ET
  - (10” coastal – 20” interior)
BEST IRRIGATION LEVEL FOR PRODUCTION 50-70%

• Higher crop yield
  – Makes up for less oil per fruit
• Good shoot growth
• Good return bloom
BEST IRRIGATION LEVEL FOR FLAVOR 35-55%

- High level of pleasant fruitiness
- Both ripe fruit and green character
- More complexity and depth
- Artichoke, apple, grass, and nuts
- Balanced bitterness
- Balanced pungency
- More water = bland oils
### MEANS OF FRUITINESS, BITTERNESS, AND PUNGENCY

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Fruitiness</th>
<th>Bitterness</th>
<th>Pungency</th>
</tr>
</thead>
<tbody>
<tr>
<td>15% ETc</td>
<td>3.6 a</td>
<td>6.0 a</td>
<td>4.9 a</td>
</tr>
<tr>
<td>25% ETc</td>
<td>3.2 a</td>
<td>4.2 b</td>
<td>3.9 b</td>
</tr>
<tr>
<td>40% ETc</td>
<td>2.7 b</td>
<td>1.7 c</td>
<td>1.9 c</td>
</tr>
<tr>
<td>57% ETc</td>
<td>2.6 b</td>
<td>0.93 d</td>
<td>1.1 d</td>
</tr>
<tr>
<td>71% ETc</td>
<td>2.1 c</td>
<td>0.30 d</td>
<td>0.30 e</td>
</tr>
<tr>
<td>87% ETc</td>
<td>1.8 c</td>
<td>0.22 d</td>
<td>0.22 e</td>
</tr>
<tr>
<td>107% ETc</td>
<td>1.7 c</td>
<td>0.20 d</td>
<td>0.20 e</td>
</tr>
<tr>
<td>Age / Size of Olive Tree (spacing)</td>
<td>Coastal Marine (ET 0.10 in/day)</td>
<td>Coastal Cool (ET 0.20 in/day)</td>
<td>Coastal Warm (ET 0.25 in/day)</td>
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<tr>
<td>-----------------------------------</td>
<td>---------------------------------</td>
<td>-------------------------------</td>
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<tr>
<td>1 ft² newly planted tree</td>
<td>0.5</td>
<td>0.5</td>
<td>0.5</td>
</tr>
<tr>
<td>4 ft² young tree</td>
<td>0.5</td>
<td>0.5</td>
<td>0.75</td>
</tr>
<tr>
<td>10 ft² young tree</td>
<td>0.75</td>
<td>1.3</td>
<td>1.6</td>
</tr>
<tr>
<td>25 ft² young tree</td>
<td>1.6</td>
<td>3.5</td>
<td>4</td>
</tr>
<tr>
<td>50 ft² young tree</td>
<td>3.2</td>
<td>6.5</td>
<td>8</td>
</tr>
<tr>
<td>50 ft² mature (Super High Density 13' x 5')</td>
<td>1.5 – 2</td>
<td>3 – 4</td>
<td>4 – 5.3</td>
</tr>
<tr>
<td>75 ft² young tree</td>
<td>5</td>
<td>10</td>
<td>12</td>
</tr>
<tr>
<td>100 ft² young tree</td>
<td>7</td>
<td>13</td>
<td>16</td>
</tr>
<tr>
<td>100 ft² mature tree (16' x 8')</td>
<td>3 – 4</td>
<td>6 – 8</td>
<td>7 – 9.3</td>
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<tr>
<td>150 ft² young tree</td>
<td>10</td>
<td>19</td>
<td>24</td>
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<tr>
<td>200 ft² young tree</td>
<td>13</td>
<td>25</td>
<td>32</td>
</tr>
<tr>
<td>200 ft² mature tree (20' x 12')</td>
<td>6 – 8</td>
<td>11.5 – 15.3</td>
<td>14 – 18.7</td>
</tr>
<tr>
<td>250 ft² young tree</td>
<td>16</td>
<td>32</td>
<td>40</td>
</tr>
<tr>
<td>300 ft² mature tree (20' x 16')</td>
<td>8.5 – 11.3</td>
<td>17 – 22.7</td>
<td>21 – 28</td>
</tr>
<tr>
<td>1 acre of mature trees with green cover crop</td>
<td>1,215-1,620</td>
<td>2,450-3,270</td>
<td>3,058-4,080</td>
</tr>
</tbody>
</table>

* Adjustments made for tree age (crop coefficient 45 – 60% of full ET for mature trees)
Elevation – Slope - Soil

- **Above 2,000 ft.** = temperature problems
- **Over 35% slope** = equipment danger, more hand labor, erosion threat, and high cost
- **Poor drainage** – clay soil, seepage, high rainfall, limited surface water movement, restrictive layers
- **Shallow soil** = less drainage & low water holding capacity
- **Mineral toxicity** = high Mg – B – Na – etc.
Low spots with poor drainage
Soil Testing

- Multiple sub samples (5-15)
- Two depths (6” and 18”) (separate)
- Each sample represents different area
- Mix thoroughly
- Analyze for big 6: pH, P, K, Ca, Mg, OM
- Analyze for minor nutrients if suspect (boron, sodium, chloride, etc.)
Soil Chemical Properties

*saturated paste extract*

- Soil pH 5.0 – 8.5
- High Magnesium (< 1:1 ratio with Ca)
- High Calcium (> 8:1 ratio with Mg)
- Adequate Phosphorous (> 10 ppm P) = OK
- Adequate Potassium (> 125 ppm K) = OK
- High Boron (> 2 ppm B)
- High Chloride (> 10-15 meq/l Cl⁻)
- High Sodium (SAR > 15)

*Spending a lot of money on exacting soil conditions is probably a waste for olives*
Alexander Valley
Dry Creek Valley
Sonoma
Lake County
Tasting Oil # 1

In order to make good oil you must be a good taster
HOW TO TASTE OLIVE OIL

• Warm & swirl to release volatiles
• Smell oil - note aroma
• Place 1-2 ml in mouth for 10 seconds
• Suck in air through the oil
• Spread the oil throughout the whole mouth
• Swallow the oil (IOOC standard)
• Close mouth and breath out through nose
• Record impressions on profile sheet
Oil Quality Factors

• **Variety** 40%
• Maturity 40%
• Processing 15%
• Growing Conditions 5%

**Variety Trial** – Planted in 1996-97 – 5 locations in Northern California
OIL OLIVE VARIETIES

1. Oil flavor “style”
2. Oil yield % – quantity and extractability
3. Fruit yield – precocity
4. Harvest method
5. Growth habit
6. Maturity season
7. Resistance to disease
8. Cold hardiness
9. Pollination
10. Cost factors
Germplasm Repository

- DNA Identification
- Fruit Size
- Pit to Pulp Ratio
- Oil Content
- Quality Profile
- Cold Hardiness
- Salt Tolerance
- Removal Force
- Disease Resistance
FRUITINESS IN OLIVE OIL

Positive Characteristics
VARIETY INFLUENCE ON FLAVOR

- **Manzanillo** – very aromatic fruity, peppery
- **Mission** - (early) very bitter
  - (mid season) slightly fruity, bitter, and pungent
  - (late) very bland and buttery
- **Sevillano** – fruity, green, herbaceous, pungent
- **Ascolano** – fruity, spicy, nutty, sweet
VARIETY INFLUENCE ON FLAVOR

- **Arbequina** – very aromatic fruity, sweet
- **Picual** – bitter and pungent (overripe flavor)
- **Frantoio** – fruity, green, herbaceous, pungent
- **Leccino** – mildly fruity, spicy, sweet
- **Coratina** – fruity, green, bitter, pungent
- **Koroneiki** – herb fruity, green, bitter, pungent
Style Generalities

**Mild**
- Arbequina
- Ascolana
- Empeltre
- Kalamon
- Leccino
- Pendolino
- Maurino
- Picudo
- Sevillano
- Taggiasca

**Medium**
- Aglandau
- Barnea
- Bosana
- Bouteillan
- Farga
- Hojiblanca
- Manzanillo
- Mission

**Strong**
- Arbosana
- Chemlali
- Coratina
- Cornicabra
- Frantoio
- Koroneiki
- Moraiolo
- Picual
- Picholine
Cold Hardiness in Olives

**Hardy**
- Arbequina
- Aglandau
- Ascolano
- Bouteillan
- Hojiblanca
- Leccino
- Maurino
- Pendolino
- Picudo
- Picual
- Sevillano

**Sensitive**
- Coratina
- Empeltre
- Frantoio
- Koroneiki
- Manzanillo
- Moraiolo
- Taggiasca

**Moderate**
- Kalamon
- Picholine
- Mission
Ripening Season

**Early**
- Arbequina
- Ascolana
- Empeltre
- Farga
- Leccino
- Picual
- Sevillano

**Medium**
- Arbosana
- Barnea
- Bouteillan
- Manzanillo
- Mission
- Moraiolo
- Pendolino

**Late**
- Bosana
- Cornicabra
- Coratina
- Frantoio
- Hojiblanca
- Kalamon
- Koroneiki
- Picholine
- Picudo
- Taggiasca

29°F frozen fruit in Nov.
Olive Disease Tolerance

- **Manzanillo**: gets less leaf spot (susceptible to cold olive knot and Verticillium wilt)
- **Gordal Sevillano**: cold hardy & less leaf spot (susceptible to olive fly)
- **Mission**: cold hardy (susceptible to leaf spot)
- **Ascolano**: cold hardy & less leaf spot & less olive knot
- **Kalamon**: unknown
## Olive Variety Disease Susceptibility

<table>
<thead>
<tr>
<th>Variety</th>
<th><em>Spilocaea oleaginae</em> Peacock spot</th>
<th><em>Verticillium dahliae</em> Verticillium wilt</th>
<th><em>Pseudomonas avastanoi</em> Olive knot</th>
</tr>
</thead>
<tbody>
<tr>
<td>Arbequina</td>
<td>S</td>
<td>VS</td>
<td>VS</td>
</tr>
<tr>
<td>Arbosana</td>
<td>VR</td>
<td>-</td>
<td>-</td>
</tr>
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<tr>
<td>Picudo</td>
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FRENCH

- Aglandau
- Picholine
- Tanche
- Bouteillan
- Salonenque
- Grossane
Cipresino
Coratina
Dolce Agogia
Frantoio
Grappolo
Itrana
SPANISH

Farga
Gordal Sevillana
Hojiblanca
Lemeño
Morrut
Pico Limon
Picual de Jaén
Picual de Estepa
Pícudo
Royal de Cazorla
Verdala
Verdale
Manzanillo

M. de Sevilla

M. de Cabra

M. de Jaén

M. Cordobes
Olive Pollination

- Some varieties are very self fertile (maybe)
- Most are self sterile
- Barouni and Sevillano are incompatible
- Manzanillo and Mission are incompatible
- Frantoio and Leccino are incompatible
- Some are somewhat self incompatible
- Set better with cross pollination – especially with bad weather
- Pollenizer within 200 feet
Tasting the 2nd oil
Taste 3rd Oil
Ascolana

• Early Ripening
• Medium yield
• Alternate bearing
• Very large fruit
• Easy to harvest
• Less foliar disease
• Low oil content
• Very Cold hardy
Tasting the 4th Oil
Tasting 5th Oil
Tasting 6th Oil
Frantoio

- Late Ripening
- Medium yield
- Alternate bearing
- Medium
- Ok to harvest
- Less foliar disease
- High oil content
- Cold sensitive
Leccino

- Late Ripening
- Medium yield
- Alternate bearing
- Medium fruit
- Easy to harvest
- Less foliar disease
- High oil content
- Cold hardy
Black skin – green inside
High Quality “Flavor” Oil Varieties

1. Arbequina, Ascolano, Bosana, Frantoio, Koroneiki, and Picual, and Picudo

Taggiasca

- Late Ripening
- Medium yield
- Annual bearing
- Large fruit
- Difficult to harvest
- Less foliar disease
- High oil content
- Cold sensitive
Hojiblanca

- High yield
- Alternate bearing
- Large fruit
- Easy to harvest
- Late maturity
- Med oil content
- Polyphenols - 250
**Picholine**

- High yield w/water
- Annual bearing
- Large fruit
- Late ripening
- Medium oil content
- Resistant to leaf spot
- Moderate cold hardy
- Difficult extraction
- Table olive
Redding Picholine

- Seedling
- Not Picholine
- Very small fruit
- Early ripening
- Medium oil content
- Resistant to leaf spot
- Cold hardy
- Difficult harvest
Picual

- Precocious
- High yield
- Annual bearing
- Large fruit
- Easy to harvest
- High oil content
- High in oleic acid
- High polyphenols (600 ppm)
Picual in Chile

6th year
Coratina

- Precocious
- High yield
- Annual bearing
- Large fruit
- Easy to harvest
- Resists foliar disease
- High oil content
- High in oleic acid
- High polyphenols (600 ppm)
Coratina in Argentina

3rd year
“Best” Two Olive Varieties in the World

- **Picual** – 75% of Spanish Production
- **Coratina** – 50% of Italian Production
Picudo

- High yield
- Annual bearing
- Large fruit
- Easy to harvest
- Less foliar disease
- High oil content
- Low oleic levels
- Med polyphenols
Nocellara del Belice

- High yield
- Alternate bearing
- Large fruit
- Easy to harvest
- Med oil content
- Med polyphenols
Nocellara del Belice in Sicily

50+ years
Bosana

- Precocious
- High yield
- Annual bearing
- Large fruit
- Easy to harvest
- Med oil content
- Med polyphenols
Varieties - Superior Productivity (precocity)

1. Arbequina, Arbosana, and Koroneiki

2. Barnea, Blanqueta, Leccino, Hojiblanca, Manzanillo, and ‘Picual.
Varieties – Superior Oil Yield

1. Coratina, Koroneiki, and Picual
Very High “Stability”
Oil Varieties

Coratina, Picual, Koroneiki, and Mission
Varieties – Superior Cold Hardiness

Arbequina, Arbosana, Leccino, Hojiblanca, and Picual.
Varieties – Superior Disease Resistance

Arbosana, Blanqueta, Bouteillan, Frantoio, Koroneiki, and Leccino.
Planting: Material

**Container Trees**

- Plant any time (with some risks)
- Best time to plant is March/April (after frost risk)
- Fall planting risks winter freeze damage.
Planting: Material

- Single trunk stock
  - Easier weed control
  - Shaker harvest.
  - Multiple shoots compete with leader

- Spacing is based on location, variety, management practices.
Planting

• Hole size – 2X container
• Deglaze hole sides with shovel after augering
• Remove or cut circling roots with minimal disturbance of root ball
• No added goodies to the planting hole.
Olive Orchard “To Do List”

- Ground preparation
- Irrigation system installation
- Layout for stakes, wires – trellis
- Planting trees
- Seeding cover crop
- Controlling weeds
- Applying compost or other fertilizers
- Training and pruning
- Olive fruit fly control
- Peacock spot control
- Harvest – transport
- Labor Management
- Machinery Maintenance
- Marketing
What to look for in an olive oil

- Fresh olive taste
- Not fermented or rancid (no defects)
- Some bitterness
- Some pungency
- Attractive fruitiness
- Depends on use
Quality is more than oil

- Standards
- Bottle
- Label
- Reputation
- Brand
- Location
- Style
- Use
- Organic
- Price
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