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OIL OLIVE VARIETIES

- Oil flavor “style”
- Oil yield % – quantity and extractability
- Fruit yield – precocity
- Harvest method
- Growth habit
- Maturity season
- Resistance to disease and cold
- Pollination
- Cost factors



Germplasm Repository

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





**Wild Olive
Seedling**

Acebuche

Oleastrum



Oil Quality Factors

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

Variety Trial – Planted in 1996-97 – 5 locations in Northern California



Cipresino

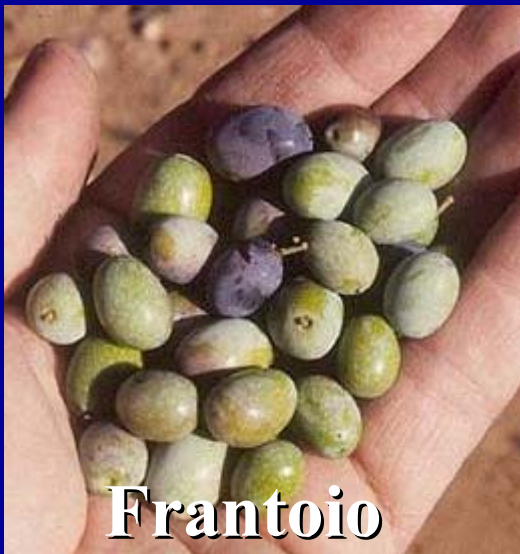


Coratina



Dolce Agogia

ITALIAN



Frantoio



Grappolo



Itrana



Leccino

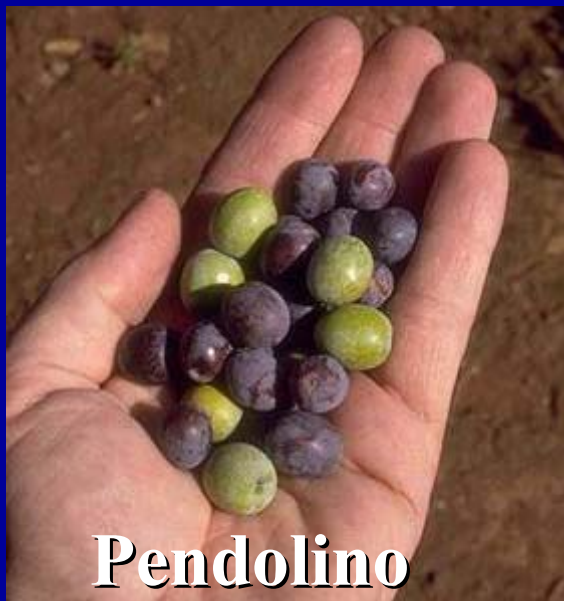


Leccio del Corno



Moraiolo

ITALIAN



Pendolino



Santa Caterina



Taggiasca



Bical



Cornesuelo



Cornicabra

SPANISH



Lecin de Sevilla



Blanqueta



Empeltre



Arbequina



Arbosana



Farga



Gordal Sevillana



Hojiblanca

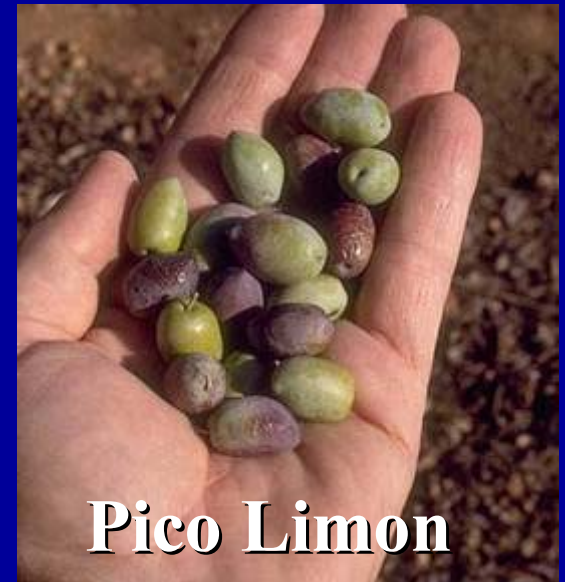
SPANISH



Lemeño



Morrut



Pico Limon



Picual de Jaén



Picual de Estepa



Picudo

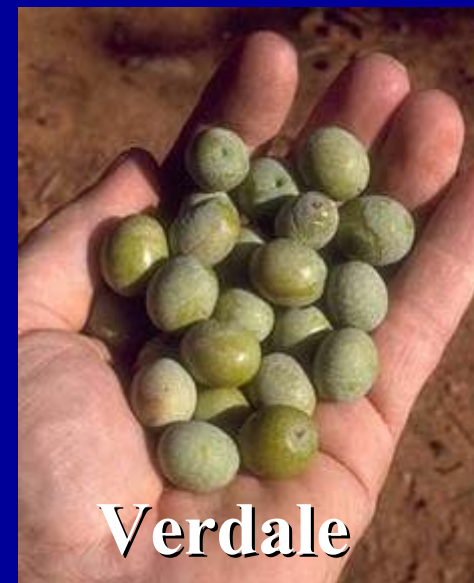
SPANISH



Royal de Cazorla



Verdala



Verdale



Picual



Picudo

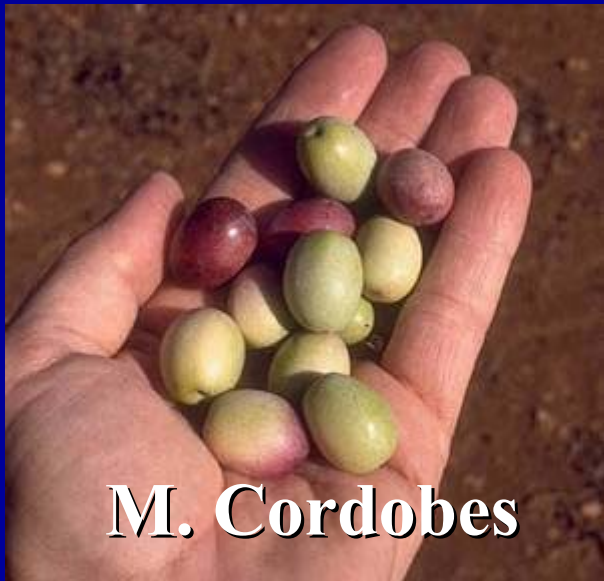


Nevadillo Blanco

SPANISH



Nevadillo Negro



M. Cordobes



M. de Cabra

Manzanillo



M. de Sevilla



M. de Jaén



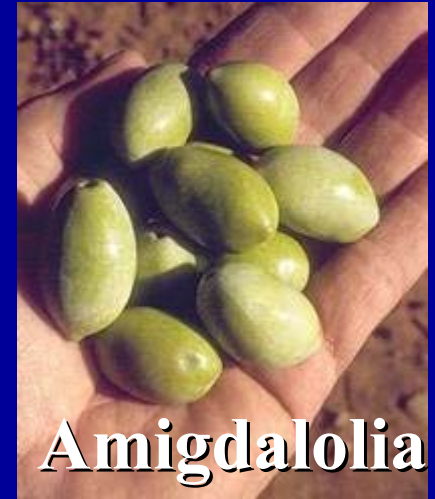
Chalkidiki



Kalamon



Koroneiki

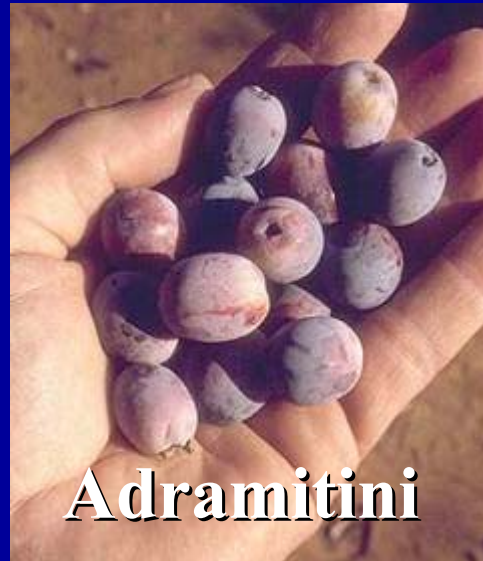


Amigdalolia

GREEK



Mirtoia



Adramitini



Megaritiki



Chemlali

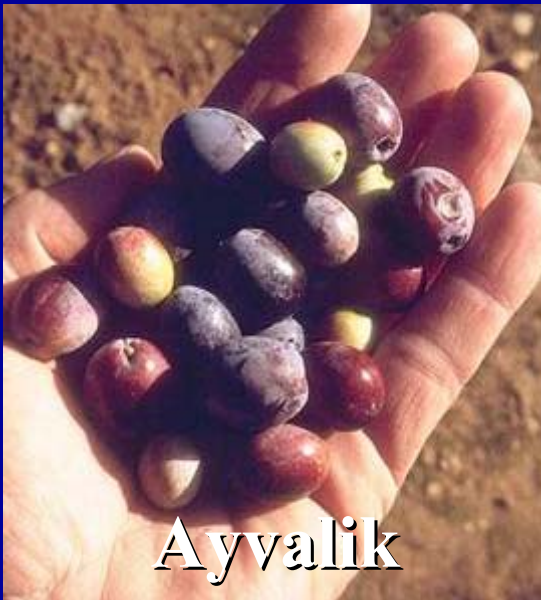


Souri



**Picholine
Marocaine**

N. AFRICA – MIDEAST



Ayvalik

- *Algeria*
- *Lebanon*
- *Morocco*
- *Syria*
- *Tunesia*



Zaity



Aglandau



Picholine



Tanche

FRENCH



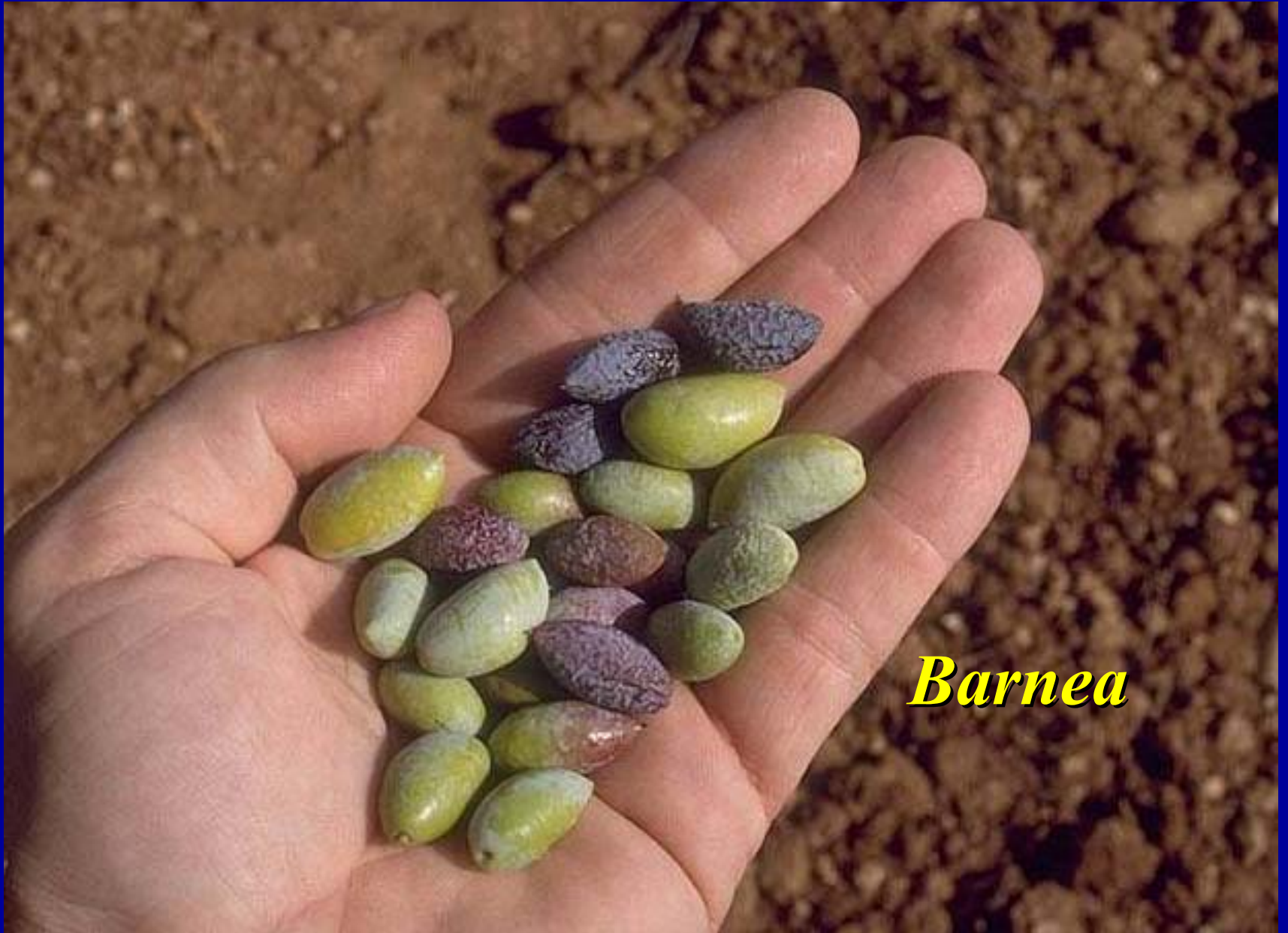
Bouteillan



Salonenque



Grossane



Barnea

FRUITINESS IN OLIVE OIL

Positive Characteristics



STYLE ATTRIBUTES

- **Variety**
- **Degree of maturity**
- **Extraction Process**

**Fruitiness type
(ripe or green)**

Intensity of Bitterness & Pungency

Depth and Complexity



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

**Five
Varieties
From
Central
Italy**



**Dolce di
Agogia**

Maurino

Pendolino

Frantoio

Leccino

INTENSITY OF SENSORY CHARACTERISTICS SINGLE VARIETY TUSCAN OILS

| Variety | Fruity | Green | Bitter | Pungent | Sweet |
|------------------|--------|-------|--------|---------|-------|
| Frantoio | ***** | ** | ** | **** | ** |
| Moraiolo | **** | ** | **** | *** | ** |
| Leccino | *** | * | * | ** | ***** |
| Pendolino | **** | * | *** | ** | *** |
| Maurino | **** | ** | ** | *** | **** |

A. Cimato, Baldini, Caselli, Marrunci, & Marzi. Florence 1995

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** – *crude fruity, bitter, pungent*



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*



Cold Hardiness in Olives

Hardy

- Arbequina
- Aglandau
- Ascolano
- Bouteillan
- Coratina
- Hojiblanca
- Leccino
- Maurino
- Mission
- Pendolino
- Picudo
- Picual
- Sevillano



Sensitive

- Empeltre
- Frantoio
- Koroneiki
- Manzanillo
- Moraiolo
- Taggiasca

Moderate

- Kalamon
- Picholine

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

Olive Pollination

- **Some varieties are very self fertile**
- **Some are self sterile**
- **Most are somewhat self incompatible**
- **Set better with cross pollination – especially with bad weather (pollenizer within 200 feet)**
- **Barouni and Sevillano are incompatible**
- **Manzanillo and Mission are incompatible**



ORCHARD SYSTEMS

- Traditional – 25 to 30 ft apart = 50 – 75 /acre
- High Density – 8 to 20 ft apart = 100 – 350/acre
- SHD – 4 x 12 to 5 x 13 ft apart = 670 – 900/acre

- Pruning by hand, hedging, topping, alternating
- Training – Tree Form
- Harvest Method
- Irrigation Management



Traditional



High Density

High Density

100 – 350 trees per acre

- $8 \times 16 = 340$
- $10 \times 15 = 290$
- $9 \times 18 = 268$
- $10 \times 20 = 218$
- $11 \times 22 = 180$
- $15 \times 20 = 145$
- $20 \times 20 = 109$





**Hedging and
Mechanical
Harvest of Large
Trees**



Central Leader Closer Spacing – Shaker



Almost any variety

***No advantages to Central Leader (mono-
cone) “Pruning and Training Systems for
Modern Olive Growing. Gucci & Cantini
www.publish.csiro.au***

Open Center Shaker



Almost any variety
Upright Form is Best



Close Spacing Open Center – Pole





Mini Shaker
Stihl
~ \$1,000



Keeping Trees Small ?



Heavy pruning to reduce size
Great vegetative vigor
No fruit on most varieties





5 x 5 meters
16.25 feet x 16.25 feet



7 x 7 meters
22.75 feet x 22.75 feet

This can be done with any variety



**View of a
super-
high-
density
orchard
from the
harvester**





Arbequina



Arbosana



Koroneiki



Koroneiki



September to September



**3 year old
trees**





**Over-the-row
harvest**

\$ 210 per acre

**\$ 42 per ton
@ 5 tons/acre**





Before Harvest



After Harvest





Before Pruning

After Pruning





**Pruning a
central
leader
Arbequina
tree in the
super-high-
density
system**



SUPER-HIGH-DENSITY SYSTEM YIELD

- **Year 2** – 0.5 tons/acre
- **Year 3** – 1.9 tons/acre
- **Year 4** – 2.5 tons/acre
- **Year 5 & up** – 3.5 to 6 tons/acre

KEYS TO SHD SYSTEM

- **Site** (*very specific*)
- **Varieties** (*3 choices now*)
- **Spacing** (*very specific*)
- **Push Young Trees** (*important*)
- **Fertility Level** (*important*)
- **Controlled Deficit Irrigation** (*vigor*)
- **Pest Control** (*important*)
- **Intensive Pruning** (*very important*)

REGULAR “HIGH DENSITY” SYSTEM

- Site (*less specific*)
- Varieties (*any*)
- Spacing (*wide range*)
- Push Young Trees (*less important*)
- Fertility Level (*less demanding*)
- Irrigation (*less specific*)
- Pest Control (*easier*)
- Pruning (*much less critical*)