

Interreg   
EUROPEAN UNION

Mediterranean

 ARISTOIL PLUS

Project co-financed by the European  
Regional Development Fund



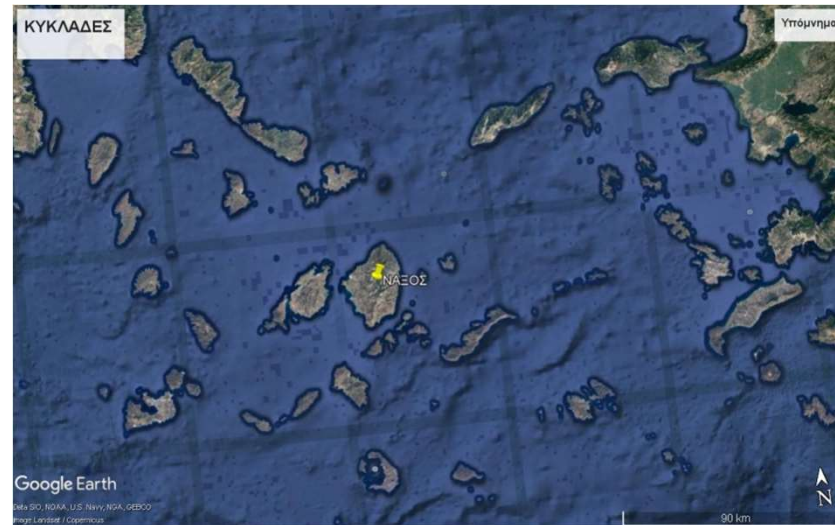
# ARISTOIL PLUS

25. 11. 2021

George Kostelenos

# AN ACCIDENTAL AND GREAT DISCOVERY THAT CHANGES THE DATA

On the island of Naxos in a protected place where even in summers there exist water was found the oldest until now olive tree of the world, variety "Throumbolia Aegean" with a trunk circumference of 29.0 m and a trunk diameter of about 10.8 m and an estimated age of at least 6,000 years .



# The pre-minoan olive tree of Naxos



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# The pre-minoan olive tree of Naxos



# Olive stones.

Olive stones of late Minoan  
period 3.200 BP.



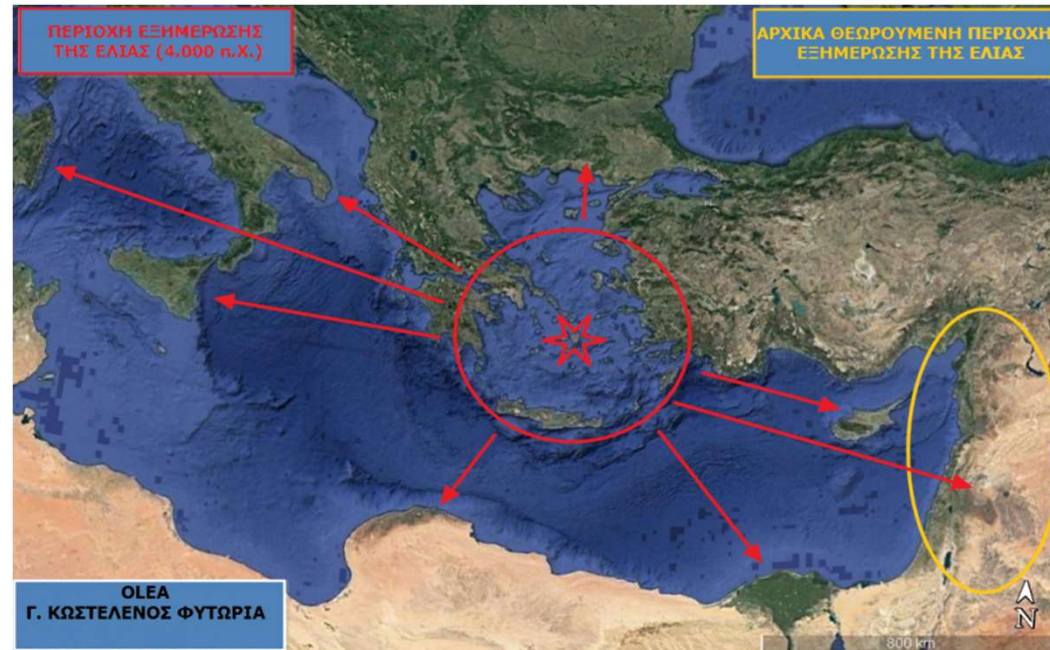
7<sup>th</sup> century olive stone from  
Andros island 2.600 BP.



# NEW THEORY OF DOMESTICATION AND SPREAD OF THE OLIVE TREE

The new theory says that the olive tree growing started in the Aegean area at least 6,000 years ago and later spread to the Middle East (Levant), the Mediterranean area and then around the world. This is very important.

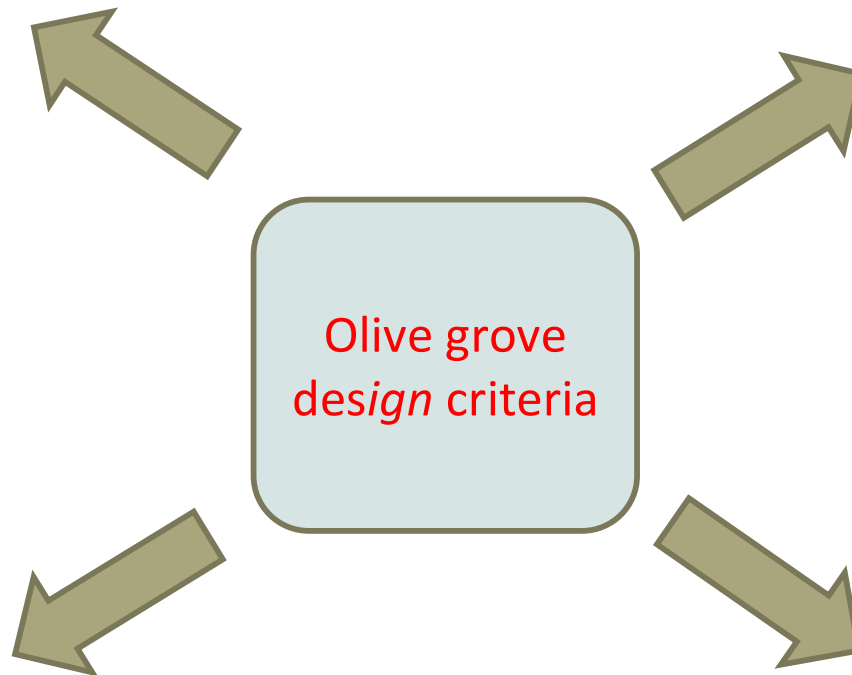
It means that Greece have a huge reservoir of olive varieties, and therefore an opportunity to produce special olive oils that other countries do not have.



# Organizing a new olive grove.

Orientation of the estate

Pendency of the estate



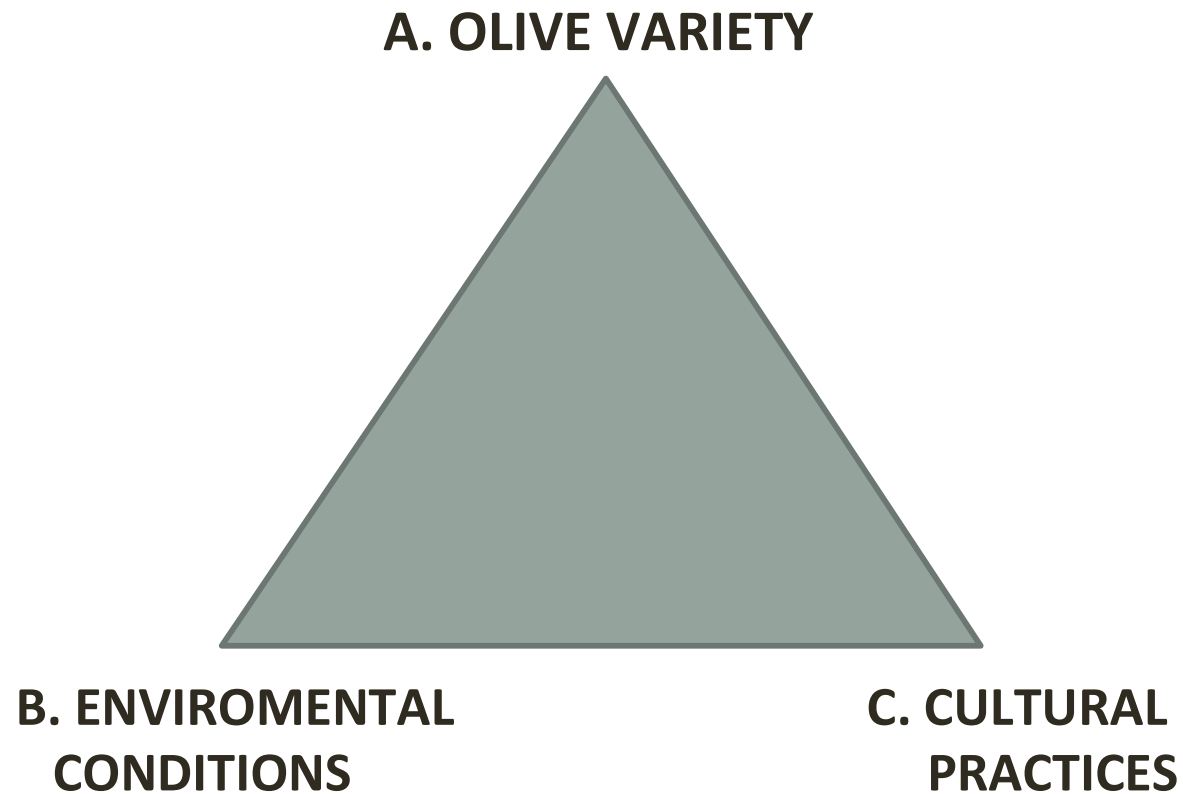
Water intake position

Entrance to the estate

# Preconditions for the production of high quality olive oil.



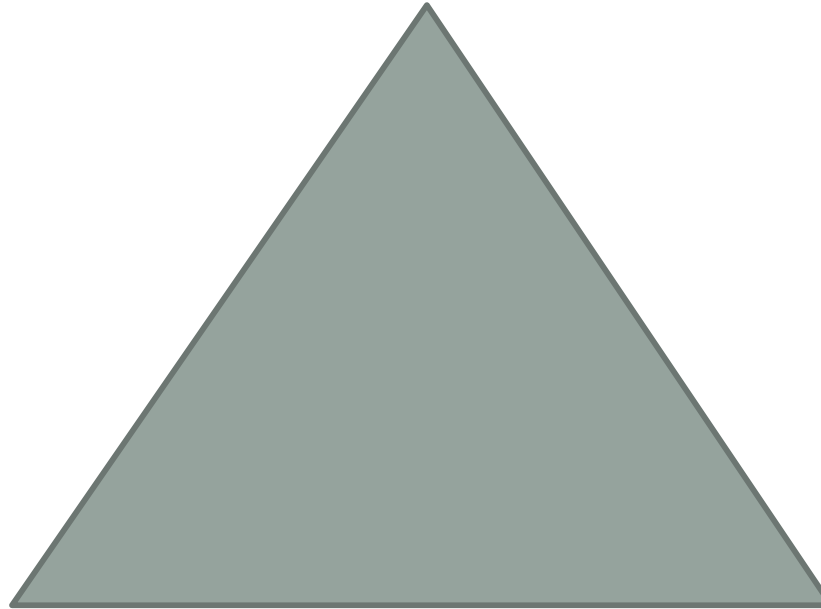
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# A. The factor “Olive variety”

**Local varieties = high adaptability**



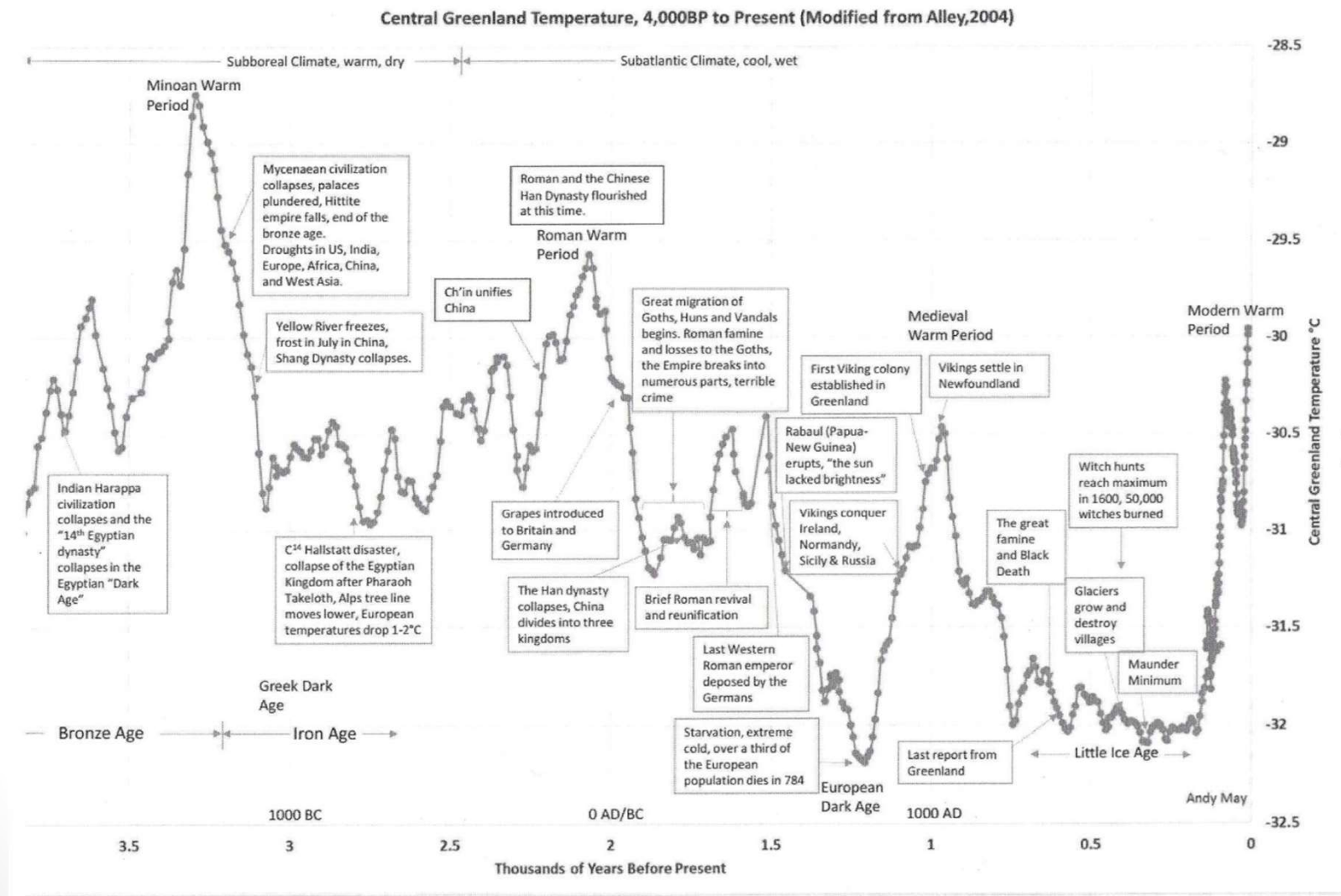
## Specific characteristics

- \* Chemical composition
- \* Content in Polyphenols
- \* Organoleptic profile

## Other characteristics

- \* Time of harvesting
- \* Resistant to pests
- \* Resistant to diseases
- \* Biology of the flower (sterility)

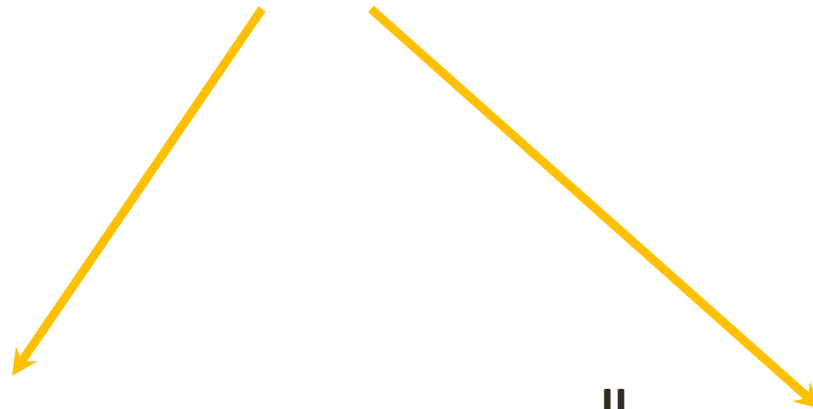
# Climatic conditions last 4.000 years of olive growing



# Three "clones" of cv. Koroneiki



## B. The factor “Environmental conditions”



### I. Soil & climatic conditions

- \*\* Soil
- \*\* Low temperatures – cold
- \*\* High temperatures
- \*\* Atmospheric humidity
- \*\* Direct sunlight
- \*\* Drought & irrigation

### II. Pest & diseases

- \*\* Pests
- \*\* Diseases

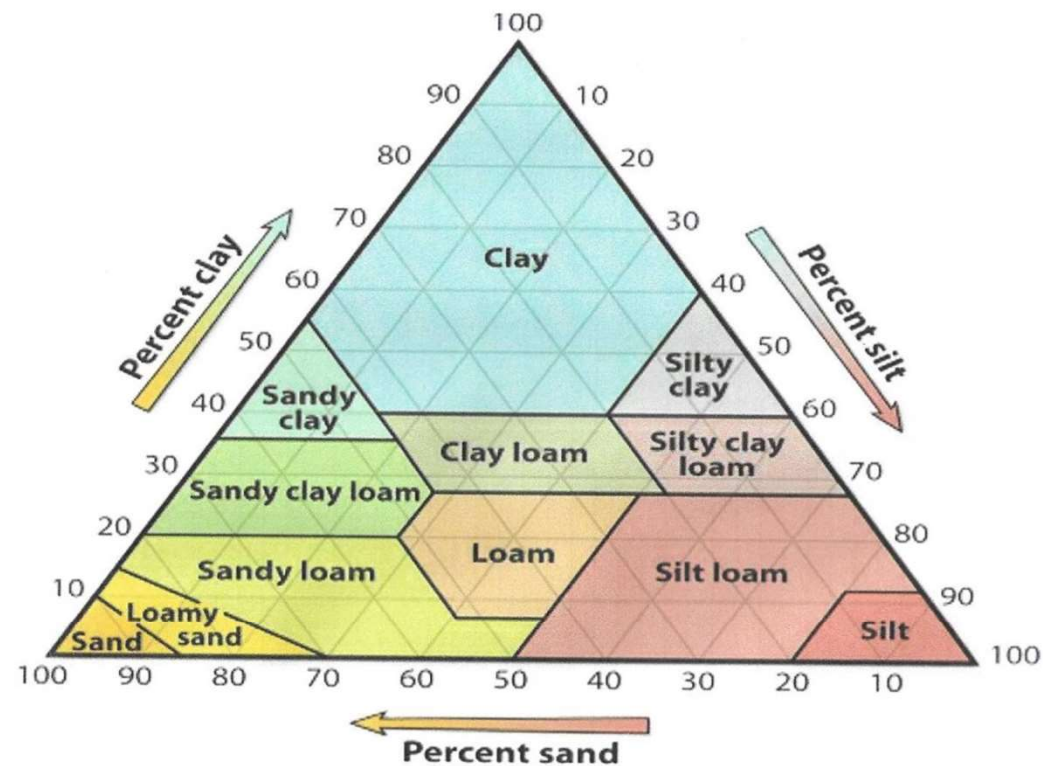
## B.I.1. The “Soil”



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- \*\* pH,
- \*\* EC (a) 2,8 dS/m b) 2,8 -  $\pm$ 4,8 dS/m c) >4,8 dS/m,
- \*\* Soil composition (sand, silt, clay),
- \*\* Undergrown water level (>2 m),
- \*\* Na<sup>+</sup>,

# Soil composition



This is the textural triangle. If you know the percent clay (flat line) and percent sand or silt, you can draw lines into the triangle to figure out what textural category the soil belongs to.

## B.I.2. The “Low temperatures”



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- \*\* Temperatures of last 15 – 20 years,
- \*\* The lowest temperature in last 15 – 20 years,
- \*\* Frequency of very low temperatures ( $-8^{\circ}\text{C}$ ),
- \*\* Period of 1<sup>st</sup> low temperature ( $-2^{\circ}\text{C}$  to  $-3^{\circ}\text{C}$ ),
- \*\* Period of last low temperature in spring,
- \*\* Hours / year below  $7^{\circ}\text{C}$  for differentiation,
- \*\* Snowfall,

## B.I.3. The “High Temperatures”



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- \*\* Temperatures data of last 15 – 20 years
- \*\* The highest temperature in 15 – 20 years
- \*\* Frequency of very high temperatures (35°C)
- \*\* Period of 1<sup>st</sup> high temperature (affects flowering time)



## B.I.4. The “Sunlight”



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- \*\* Sunlight hours / day (>4-5 hours direct sunlight/day),
- \*\* Cultivation area,
- \*\* Density of canopy,
- \*\* Reaction of the tree to pruning practices.

## B.I.5. The “Atmospheric humidity”



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Humidity is very important factor because influence pest and diseases severity particularly:

- \*\* *Spilocaea oleagina* (3°C – 30°C & optimum 10°C - 20°C ),
- \*\* *Cercospora cladosporioides*,
- \*\* *Colletotrichum gloeosporioides*, *C. acutatum*,  
*C. clavatum* (12°C - 25°C + high atm. humidity),
- \*\* *Camarosporium dalmaticum* (optimum 30°C),
  
- \*\* *Pseudomonas savastanoi pv. savastanoi*,
  
- \*\* *Bactrocera oleae*.

## B.I.6. The “Drought & irrigation”



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The behavior in drought conditions is very important because it effects the economy of olive groves and the quality of olive oil.

Not all olive varieties are economically suitable under drought conditions because of low or none productivity.

## B.II. The “Pests and diseases”



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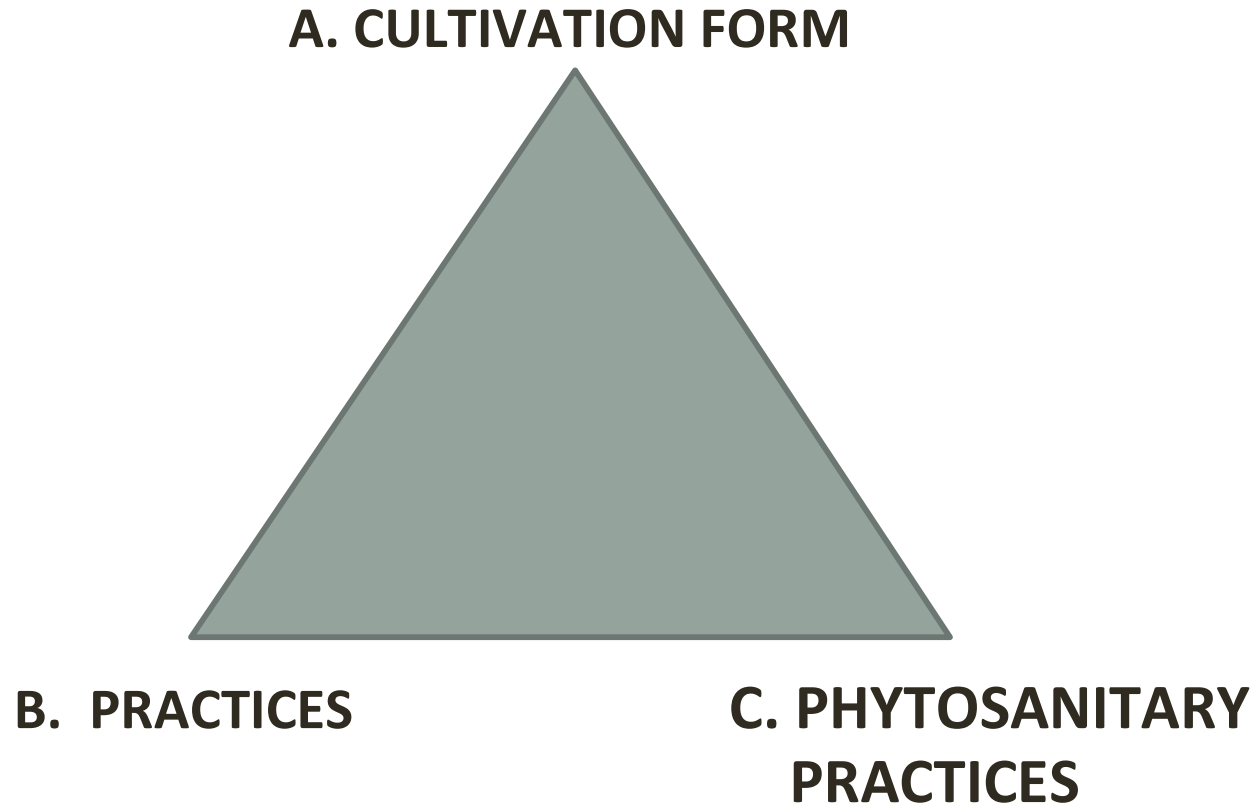
The most important diseases of the olive culture are:

- \*\* Verticillium wilt – we need resistant rootstocks
- \*\* *Xylella fastidiosa*.
- \*\* *Spilocaea oleagina*.
- \*\* *Colletotrichum gloeosporioides*, *C. acutatum*, *C. clavatum*.

The most important pest of olive culture is:

- \*\* *Bactrocera oleae*

# C. Cultural practices.



## C. A. Cultivation form

The most important cultivation forms of the olive culture are:

|                     |                        |
|---------------------|------------------------|
| ** Traditional      | < 200 trees/ Ha.       |
| ** Intensive        | 200 – 400 trees/ Ha.   |
| ** Dense            | 400 – 800 trees/ Ha.   |
| ** Super High Dense | 800 – 2.000+ trees/Ha. |

Less number of olive varieties

## C. B. Practices

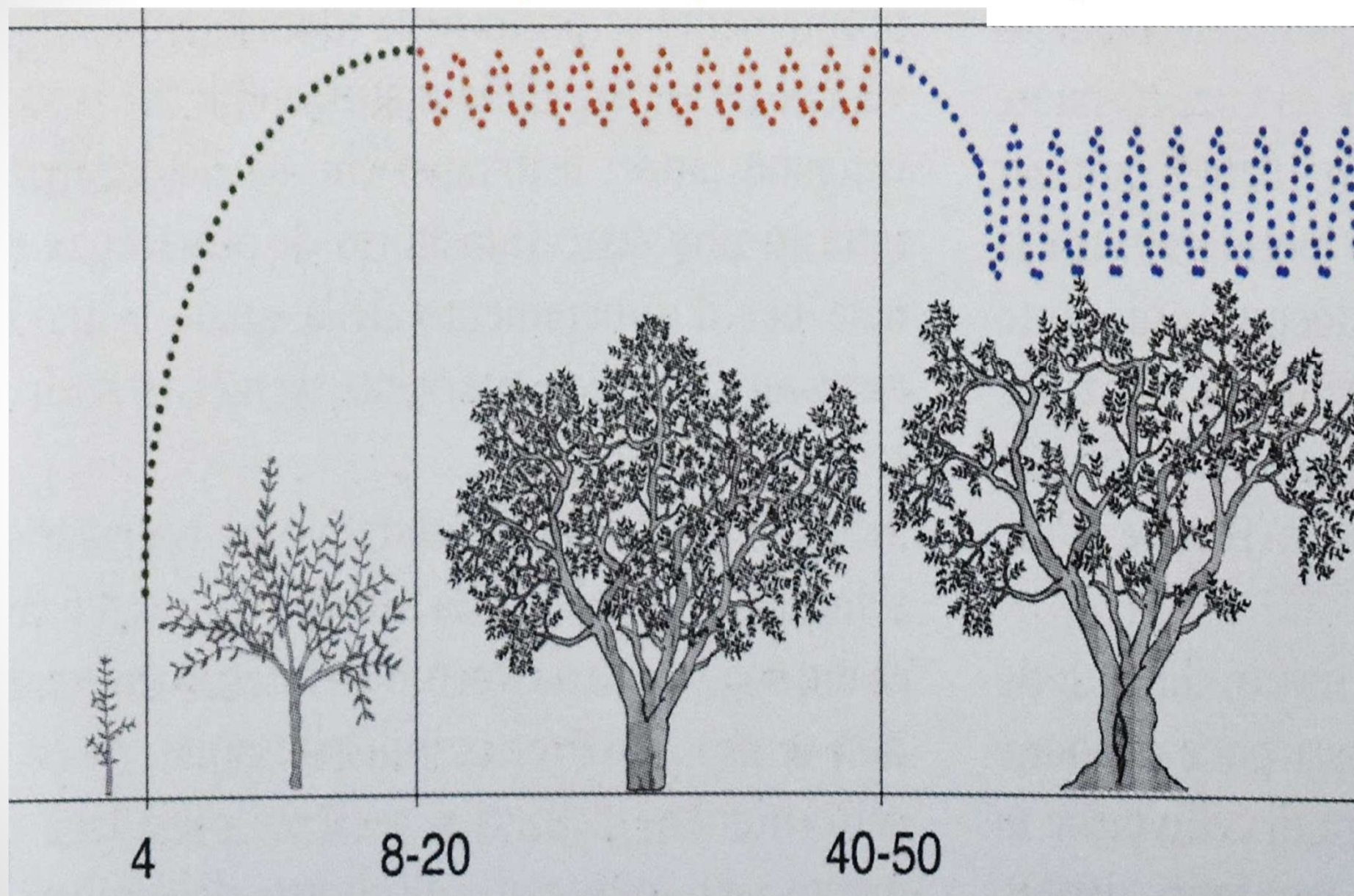


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### The most important practices on the olive trees are:

- \*\* Pruning
  - a) Frequency
  - b) Intensity
  
- \*\* Irrigation
  - a) Irrigated
  - b) Semi-irrigated
  - c) No irrigated
  
- \*\* Soil fertility
  - a) Non
  - b) Chemical fertilizers
  - c) Organic fertilizers

# The productive stages of the olive tree (A. Cimato)





# Pruning Connection of roots and branches

The primary branches are directly attached to the roots with vessels that are visible on the trunks as cords.

Asymmetric growth of branches on young olive trees also means asymmetric distribution of roots.

The initial root system of young olive trees should consist of at least 3 well-distributed roots.



## C. C. Phytosanitary practices



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In plant protection there are four basic options:

- \*\* None
- \*\* Traditional (chemical) management
- \*\* Integrate management
- \*\* Organic management

# The most important problems of olive growing.



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The most important problems to be solved by olive growers worldwide are:

- a) Disease resistance and especially Verticillium resistance which becomes a limiting factor for the expansion of olive cultivation.
- b) There are also recent serious problems from Xylella fastidiosa,
- c) Drought resistance,
- d) Resistance to salty water,
- e) Cold resistance (olive cultivation is increasingly spreading to cold regions, mainly in Central Asia),
- f) Tree vitality control – dwarfism.

# Reasons to apply grafting techniques in olive growing



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## Grafting of olive plants is done in 4 cases:

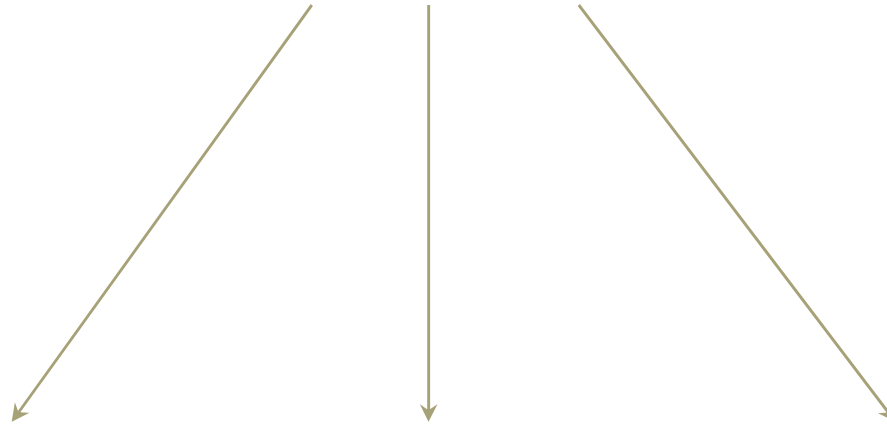
- a) When it is necessary to change variety into an existing tree.
- b) When we can not multiply the plants in any other way.
- c) When propagation by grafting is easier and cheaper than other propagation methods.
- d) When we want to give characteristics in a variety that it does not have the variety but the subject has.

The last reason is the most important and we see it applied today in arboriculture, viticulture, horticultural and ornamental plants.

For the production of quality olive oil in already established olive trees are very important .



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- A. HARVESTING**
- B. OIL EXTRACTION**
- C. OIL STORAGE**

# A. Harvesting



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- a) Time of harvesting (early, middle, late),
- b) Methods of harvesting,
- c) Storage in the field and transport materials (sacks, plastic boxes, etc.),
- d) Storage conditions in the oil mill (open area, covered area, controlled temperature conditions),
- e) Time until oil extraction in the oil mill (immediately, in few hours, less than 24 hours, more than 24 hours),
- f) Working condition and cleanliness in the oil mill.

## B. Olive oil extraction



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- a) Type of oil mill (2-phase, 3-phase, other),
- b) Crusher,
- c) Knitter – Malaxer (Knitting – gramolatura),
- d) Oil separation,
- e) Time until oil extraction in the oil mill  
(immediately, in few hours, less than 24 hours, more  
than 24 hours).

## C. Olive oil storage



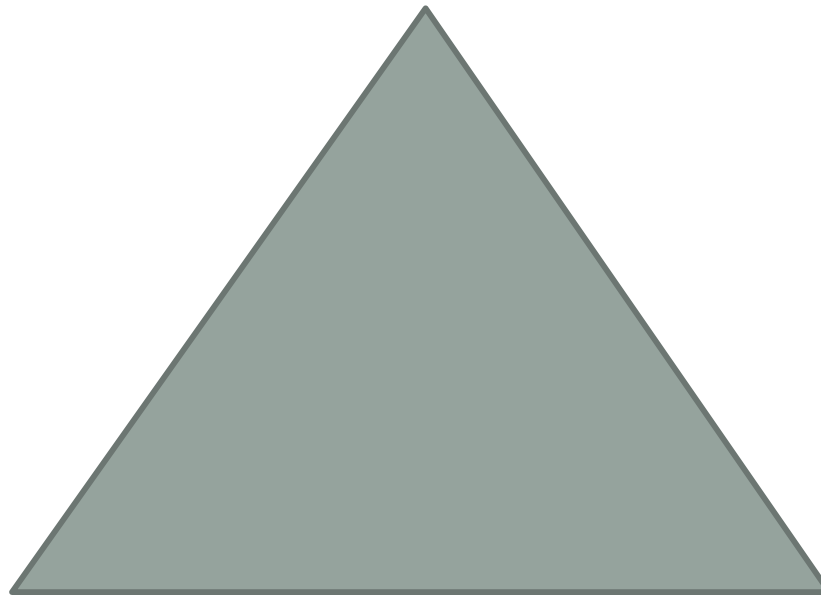
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- a) Storage materials (nix, plastic, ect.)
- b) Storage conditions ( with oxygen, argon, ect.)
- c) Temperatures (controlled, no controlled ect.)
- d) Light (protected, no protected ect.)
- e) Storage time.



# FINALLY : The triangle of olive oil commercial success.

**A VERY GOOD OLIVE OIL QUALITY**



**A VERY ATTRACTIVE PACKING**

**A VERY GOOD HISTORY TO SAY**

# Insect proof area



# Olive tree mother plants in pots.







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