

**The required conditions for  
establishing the orchard**

**by  
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## Temperature

**The most important climatic determinant for citriculture.**

### Frost.

**Flowers and young fruit are particularly sensitive to under 0°C temperatures.**

**Lemons are more susceptible.**

**Optimum mean daily temperatures: 23 - 30°C degrees.**

**Growth is reduced above 38°C .**

**Root growth occurs when soil temperature is above 12°C degrees.**

## **Temperature ( cont.)**

**Abrupt increase of temperatures to higher than normal or extreme temperatures accompanied by low relative humidity are injurious. ( especially to young fruit and leaves).**

**It is important to keep soil wet .**

**Navel oranges and Satsuma mandarins are very sensitive.**

# winds

**Winds cause fruit scarring and at high velocity fruit is shaken off trees.**

**Additional damage occurs in the form of desiccation and scorch of leaves and the extensive death of small twigs.**

**The stronger damage occur when high temperatures and low humidity is associated with the winds.**

**Typhoons , Hurricans**

# Windbreaks

**Windbreaks can reduce the occasional damage by winds to acceptable levels.**

**Suitable windbreaks reduce wind velocity to Ca. 50% and they improve yield and fruit quality**

**Windbreaks have to be: Rapid growing,  
Narrow and tall,  
Mechanically strong.  
Density sufficient.  
Not subject to  
insects and diseases attacking citrus**

## Relative humidity

**Relative humidity is not a limiting factor for citrus growing.**

### Effects of relative humidity:

**a. Transpiration- is greater in areas of low humidity.**

**b. High relative humidity cause more fungus diseases.**

**c. High relative humidity, especially when it is in combination with high temperatures, may cause poor fruit texture.**

# Soil

**Soils provide anchorage for citrus and furnish the water and mineral nutrients required for their growth.**

**The deep well drained sandy loam soils are the best for citrus production.**

**With careful adjustments of cultural practices to the type of soil, citrus can be grown satisfactorily on a wide range of soils.**

## **Physical characteristics of soils**

**Texture- size distribution of the soil particles.**

**Structure- The positional relation of these unit particles to one another in the various soil strata or horizons.**

**These factors determine the total pore spaces and the size of pore spaces through which water and air must move in soil.**



## Water infiltration and soil drainage

**Sandy soils- water moves rapidly.**

**Heavy soils- slow movement of water.**

**Small particles may be aggregated into water- stable particles of larger size, which increases infiltration.**

**Hardpan- impermeable layer: is created when particles of any size are cemented together.**

**Soils with hardpan layers are not suitable for citrus growing.**

## Chemical characteristics of soil

### Soil fertility

**Composition of macroelements ( nitrogen, phosphorous, potassium and magnesium) microelements and organic matter in soil. It is checked by soil analysis.**

**Soil fertility is not a limiting factor for citrus growing since organic matter and chemical fertilizers can be added to the soil before the plantation and later.**

## **Salt excess in soil**

**Citrus trees are sensitive to high concentrations of salt.**

**Salty soils can be reclaimed under certain conditions if soil drainage is adequate.**

**In case of citrus plantation in soils with relatively high salt concentration, citrus varieties should be grafted on adequate rootstocks.**

# Soil pH

**Soil pH recommended for citrus is 5.5-7.0.**

**Low pH causes:**

**Aluminium toxicity above 1 ppm).**

**Calcium or/ and magnesium deficiency**

**Manganise toxicity( above 4 ppm).**

**Since manganese is a plant nutrient , and is soluble in too acid pH it may leach and be deficient if its concentration is below 1 ppm.**

**When pH level is under 4.2 - the high concentration of hydrogen ions may cause direct effect on plant growth and stop cation uptake.**

## Soil pH (cont.)

### Increasing soil pH:

Can be achieved by applying materials such as limestone or dolomite.

The best lime that will react quickly is lime that passes 100 mesh sieve. Anyway a good grade of lime is more than 60 mesh.

Alkaline soils: Appropriate rootstock should be planted.

Cultural practices: ( Sprays of microelements, iron application)

## **Depth of soil**

**Depth of 70 cm is considered as the minimum required depth for citrus plantation.**

**Soil depth can be increased for increasing rooting depth by building ridges or terraces.**

**The agrotechnical practices in the orchard should be adapted to the depth of soil.**

**Subsoil water ( underground water).**

**High level of subsoil water is hazardous to citrus trees. Sometimes in such soils citrus trees are planted on ridges.**

**Installation of drainage before plantation should be considered**



# Topography

**Topography is important for planning :**  
**orchard layout**  
**type of irrigation system**  
**Erosion and flood control**

**Contour planting- is used when slopes are in excess of 3% but not greater than 25%.**

**Planting on terraces- is used on lands with slopes in excess of ca 5%.**

## Rainfall

**Citrus trees need water all over the year and in case of dry periods irrigation should be planned.**

**Deficiency of available soil moisture during the period of fruit setting might cause abnormally heavy shedding of fruit.**

**Large amounts of rainfall in short periods can cause erosion and flooding.**

**Break in irrigation in tropical regions is essential for flower induction.**

## Choosing the rootstock

### The requirements from the rootstocks:

- a. compatibility with scion.**
- b. Nursery adaptability- high percentage of nucellar embryos, easily budding.**
- C. Soil adaptability- to texture, structure, depth, pH , salinity, moisture, nutrient supply, pest and diseases in soil.**
- D. Climate adaptability- the degree of hardiness to cold conferred by the rootstock.**

## Preparing the land before plantation

- Optional preparations if needed
- Soil drainage- When the level of underground water is high.
- Liming- When soil pH is too low. (To prevent aluminium toxicity). supply limestone or dolomit.
- Addition of manure or nutrition elements according to soil analysis.

## Preparing the land before plantation (cont.)

### Planting on ridges:

**in cases of : Heavy soil**

**High levels of underground water.**

**Improves drainage.**

**Improves tree development (heat).**

Establishing terraces. ( when needed).



## Spacing of trees

**Is decided according to tree size.**

**( Grapefruit - big trees Mandarins-smaller).**

### The possibilities:

**a. Final spacing plantation.**

**b. Dense plantation and planning to thin trees later.**

**C. Dense plantation ( for ever?).**

**Small trees infected by exocortis.**

**Keeping tree size by pruning**

# Planting operations

- **Staking the tree location.**
- **Installing the irrigation system.**
- **Digging holes for planting.**
- **Planting ( high plantation).**
- **Irrigation .**



# PLANTING



# PLANTING





# AFTER PLANTING





# AFTER PLANTING



## **CITRUS NURSERY PLANT CRITERIA**

**Upright.**

**Height: 60 - 80 cm.**

**Diameter(caliber):>10 mm**  
(Easy peels: > 8 mm).

**Straight budsoot (Fusion).**

**Free from: VIRUSES.**

**VIRUS-LIKE.**

**NEMATODES.**

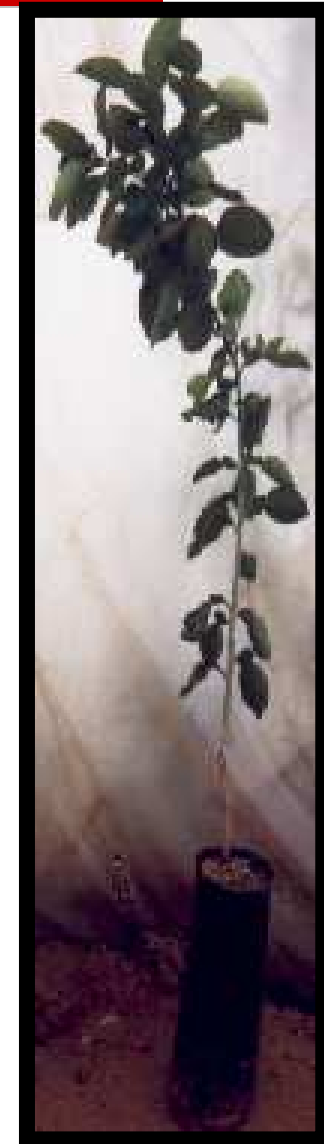
**INSECTS.**

**WEEDS.**

**CHLOROSIS.**

**ROOT ROT**

**Full and healthy roots.**



**Thank you**

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