Use of substrates for intensive production of vegetables in Europe and Mediterranean regions

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State of art of soilless culture

- Protected cultivation have a worldwide surface of nearly 2 million hectares
  - Soilless culture extend on about 31.000 hectares
  - Netherlands 6,000 ha
  - Spain 5,000 ha
  - Italy 1,000 ha
  - China 1,000 ha

Hydroponics classification

- System without substrate (NFT or floating)
  - suitable for short cycle
- Aggregate culture


NFT system

floating system


aggregate culture

Type of substrate

- The most diffuse are
- *Peat, Perlite, Rockwool slabs , coconut coir,*
- Beyond these we have
- *sand, sawdust, volcanic rock, pumice and expanded clay*
- *dregs of processed grapes and rice husk*

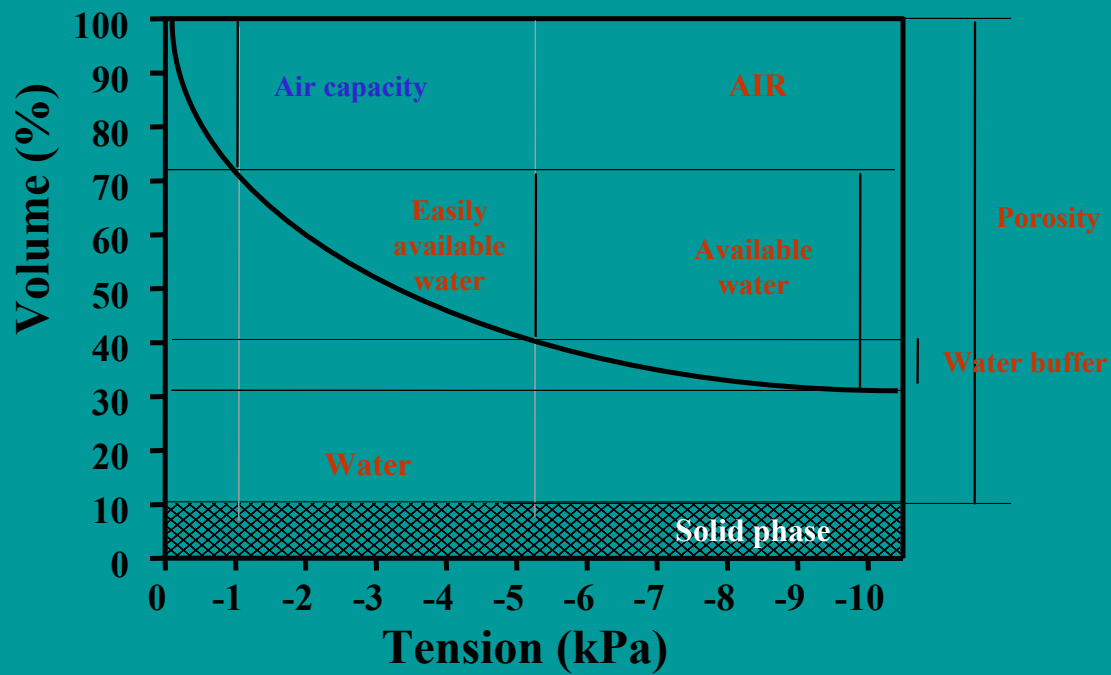
Substrate Characteristics

- The substrate should provide the mechanical support
- Locally manufacture substrates are preferred
- The environment impact should be taken in account

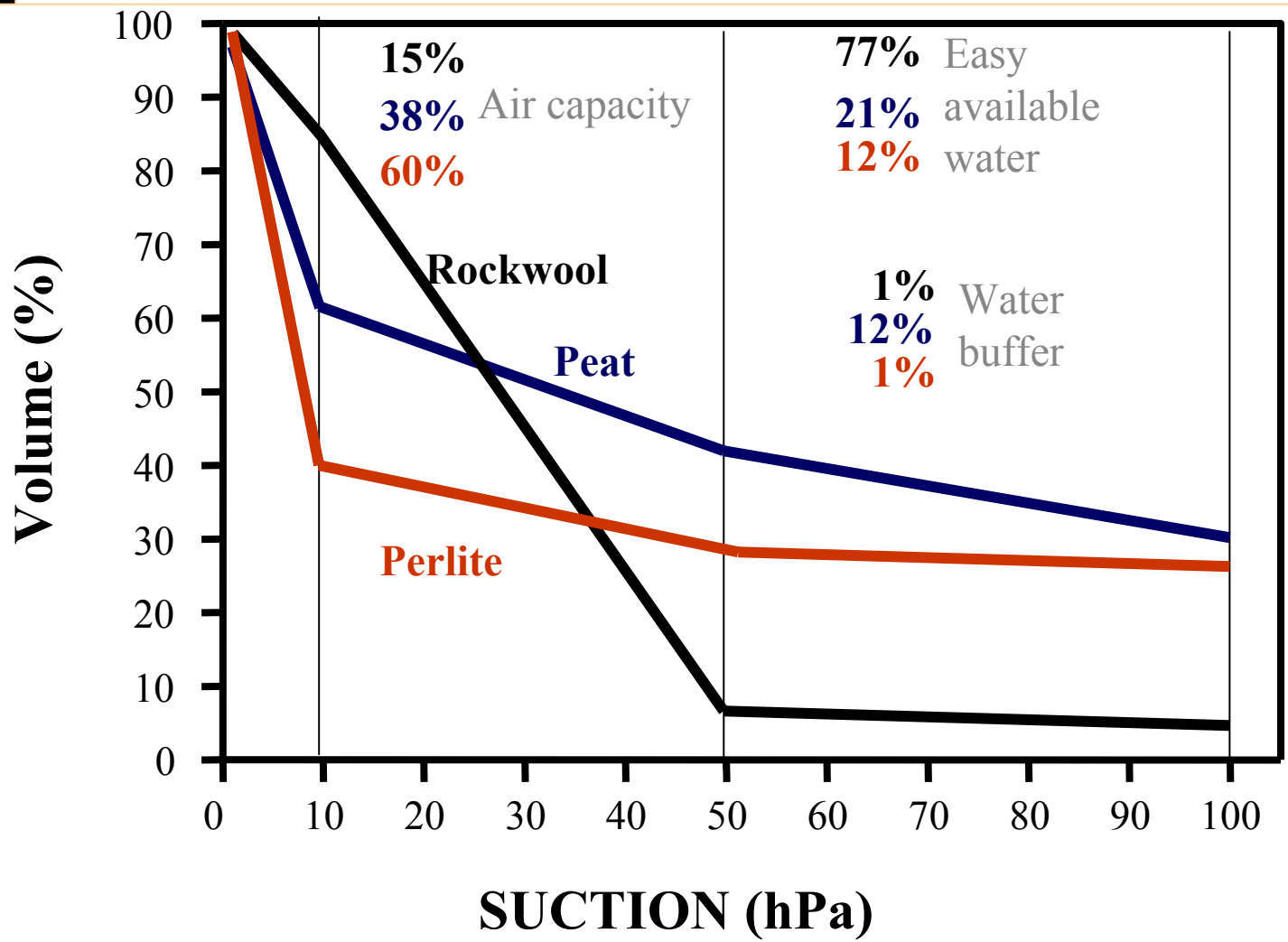
Substrate characteristics

- Mechanical properties
- Porosity
- Water and air capacity
- pH
- Content of soluble salts
- Chemical inertia
- Ability to maintain original characteristics
- Absence of pathogens

Hydraulics properties

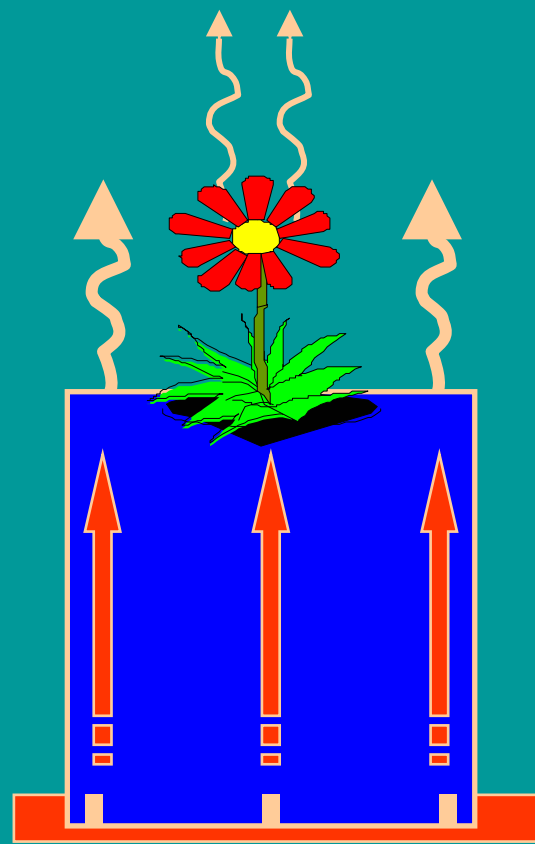


Hydraulics properties of three substrates



Capillary action

- The ability of substrate to transfer the water from the button to the surface
- It depends on the pore size of substrate and tension of irrigation water



Sub-irrigation

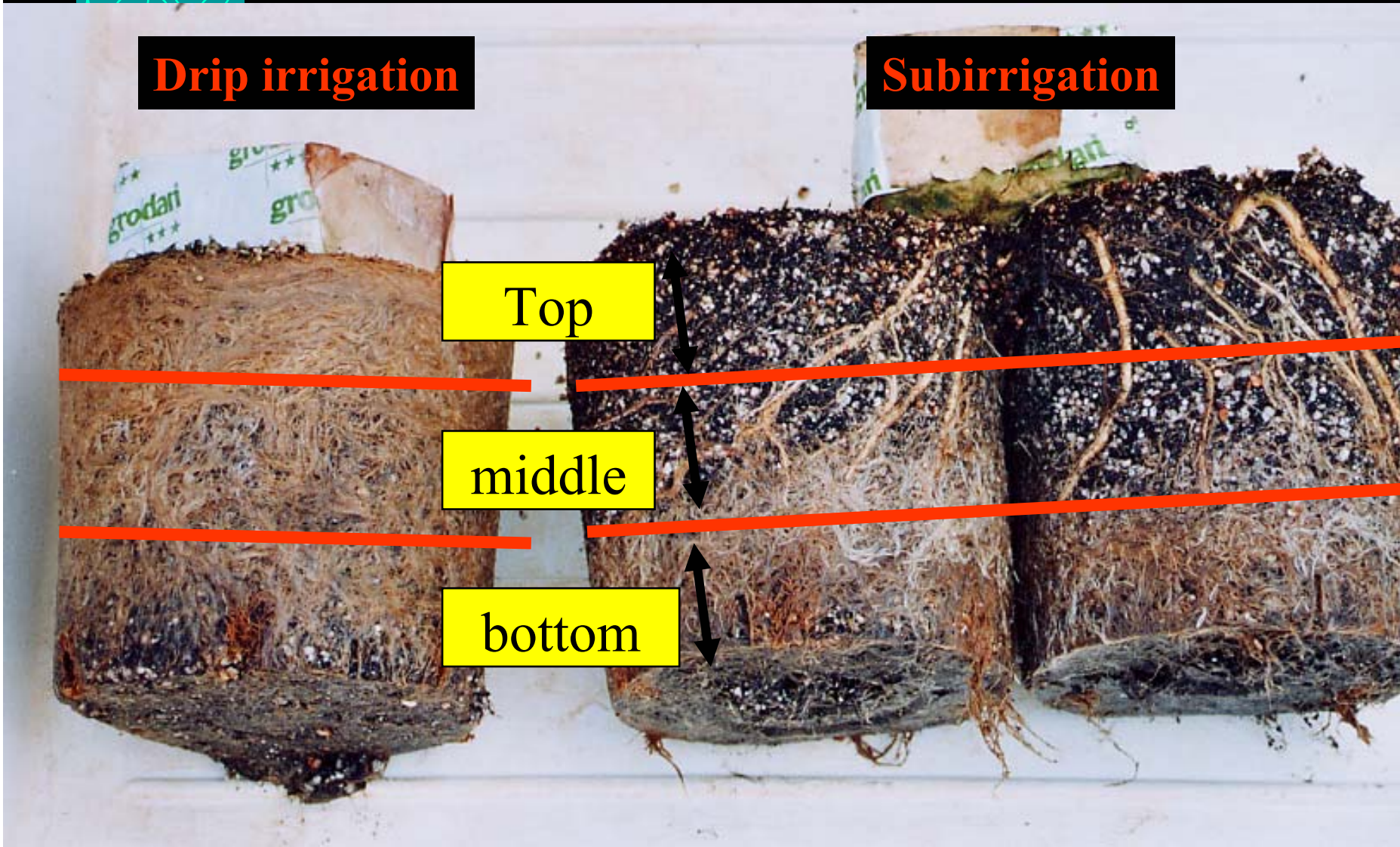
Sub-irrigation

Advantages:

- It reduces the risks of spreading root pathogens
- It minimises the interference of substrate and plant root system on the composition of the nutrient solution
- **Disadvantages**:
- It determines salt accumulation in the upper part of the growing container


Sub-irrigation

Sub-irrigation: effect on the root apparatus



The substrata used in the Mediterranean countries

- Perlite
- Peat
- Volcanic rock
- Pumice
- Pouzolane

Concluding remarks

- Which will be the use of substrate in the next future?
- Which will be the role of peat?
- May compost substitute peat?